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PREPARED ON BEHALF OF

His Highness the Maharaja of Jaipur

IN CONNECTION WITH THE VISIT OF

His Excellency the Earl of Minto,

P.C., G.C.S.I., G.C.M.G.,

Viceroy and Governor-General of India.

October 1909.

PREFACE.

THE present notes have been prepared with the primary object of placing before His Excellency Lord Minto on the occasion of his approaching visit to Jaipur an account of the Jaipur State and its Capital that shall be fuller and more recent than those already existing. The various descriptions have been entrusted to the authorities most competent to deal with them. Thus the notes on the Observatory, the Public Works Department, the School of Art and the Churches have been contributed by Colonel Sir Swinton Jacob, K.C.I.E.; the notes on the history of the State and about Amber, the ancient capital, we owe to the Rev. G. Macalister, D.D., who has made a long study of the subject and whose conclusions on doubtful points may be accepted as more reliable than those arrived at by former authorities; while the notes on the State Medical Department and the Jaipur Museum are taken from descriptions originally written by Dr. T. H. Hendley, C.I.E., and revised in 1902 by Colonel P. Durrell Pank, I.M.S., Residency Surgeon. To all these gentlemen my best thanks are due for their valuable contributions.

I must also thank the following gentlemen for the assistance they have given: (1) Rai Bahadur Purohit Gopi Nath, M.A., (2) Baboo Sanjwan Gangoli, M.A., F.R.S.E., Director of Public Instruction, (3)

Baboo Jogendra Nath, Assistant Surgeon, (4) Pundit Chandra Dhar Guleri, B.A., (5) Lala Jagan Nath, Librarian, (6) Rai Sahib Norang Rai, Superintendent Jails, (7) Rai Bahadur Dhaupat Rai, Sardar Bahadur, C.I.E., Superintendent Transport Corps, (8) Tewari Din Dayal Foujdar, and finally Purohit Hari Narain, the Residency Vakil, who has taken much interest in the collection of the materials of the book.

I must mention too that I have extracted much useful information from the account on Jaipur in the Imperial Gazetteer (1908).

In conclusion, I would wish to observe that this little book though compiled for a particular occasion will be found to contain a certain amount of information on practically every subject of general interest connected with the State, and it will, it is hoped, constitute a useful Guide-book to visitors and sight-seers.

H. L. SHOWERS,
LT.-COLONEL,
Resident at Jaipur.

JAIPUR,
1st October 1909.

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NOTES ON JAIPUR.

CHAPTER I.

GENERAL DESCRIPTION.

AIPUR, the wealthiest and most populous of the Native States in Rajputana, covers an area of 15,579 square miles. The population at the 1901 Census was 2,658,666 made up principally of Brahmins, Jats, Minas, &c. The Rajputs number 124,000, being mostly Kachwahas, of which clan the Maharaja of Jaipur is the head.

2. The income of the State (*i.e.* *Khalasa* lands) is put at sixty-five lacs but it is probably more. Apart from the *Khalasa* some three-fifths of the State lands are in the possession of nobles and others, and the total income must be considerable. The number of the nobles big and small is put at 1,180; of these 180 are of the first rank or *Tazimi*, while 400 are *Khas-chauki* and 600 *Imtiazis*.

3. The number of towns and villages in the State is 5,773, the principal towns being Jaipur, Sikar, Fatehpur, Nawalgarh, Jhunjhunu, Hindaun and Sawai-Madhopur. For administrative purposes the country is divided into eleven *Nizamats* or districts and thirty-three *Tahsils*.

The Jaipur country for the most part is open and level, though its surface is crossed and diversified by groups and ranges of hills and numerous isolated

peaks. These latter are often crowned by the castles of the Thakurs, giving the country a picturesque and romantic appearance. The central portion of the State, where lies the City of Jaipur, consists of an elevated table-land from 1,400 to 1,600 feet above the sea.

The Ruler of this fine and historical land is Colonel His Highness Maharaja Sir Sawai Madho Singh Bahadur, G.C.S.I., G.C.I.E., G.C.V.O., I.L.D., who was born in 1861 and came to the *Gaddi* in 1880. His reign has been one of peace and prosperity and has witnessed many important improvements and developments. Roads and railways have been added, valuable irrigation and other works have been constructed, and fine buildings like the Albert Hall now embellish the City. His Highness' charitable munificence is proverbial, in illustration of which it is only necessary to mention his gift of twenty lacs of rupees to the Indian Peoples' Famine Relief Trust. The State Medical Department is a model of completeness and excellence, while there are Colleges and Schools, a public Library, public gardens, water-works, gas-works and such like marks of advancement and civilization.

His Highness visited England in 1902 for the Coronation of King Edward VII. He enjoys a personal salute of twenty-one guns.

The State maintains an Imperial Service Transport train of 1,200 ponies and 600 carts, and local forces consisting of about 5,000 infantry, 5,000 *Nagas* (irregular infantry), 700 cavalry and some artillery. There are also the city police numbering 855, and

the district police and chowkidars who total 6,030. These various forces cost the Darbar some Rs. 16,00,000 a year.

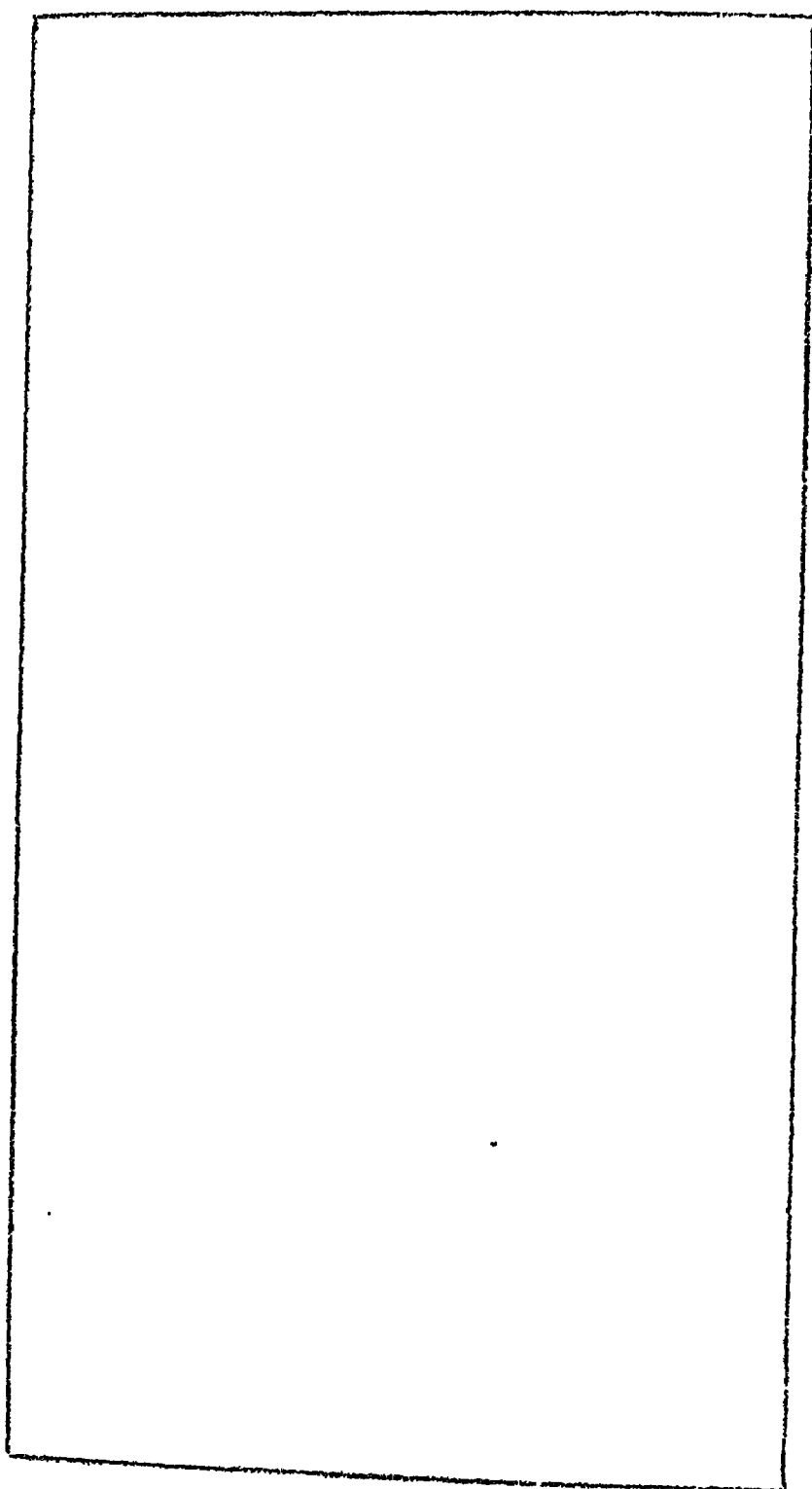
In addition to the above there are 5,782 Jagirdars' horsemen who render service to the Darbar; while many thousands of Minas are employed by the State on various terms in charge of forts and otherwise.

The average rainfall of Jaipur City is just under 23 inches, and the average mean temperature 77°.

Jaipur has a coinage of its own called *Jhar Shahi*, the coins struck being of gold, silver and copper.

The State has its own Postal system, and there are 86 local post offices. There are also 34 Imperial Post Offices and 14 Government Telegraph Offices. There is an issue of State stamps.

Six branches of the Bombay, Baroda and Central India Railway and some 80 miles of the Nagda-Muttra Railway traverse the State with a total of 383 miles of line within the State limits.



CHAPTER II.

BRIEF HISTORY.

The Kachhwāhā family of Rajputs, which claims to be descended from Rama the hero of the Rāmāyan, has some legitimate cause for pride. In the short space allowed for this sketch only a few of the more prominent features of a most interesting history can be delineated.

Out of the dimness of a far back past some clear historical facts about the Kachhwāhā Rajputs emerge, which enable us to trace their route from Ayodhyā, the land of their birth, to Dhundhār, the ancient name of Jaipur, where they now rule. Rohtasgarh on the river Son which they founded, and which still exists, is the first place where they came clearly into view. Then we find them in a tract of land between the Sindh and Pahuj rivers to the north of Gwalior, which tract unmistakably bears their name to this day. We next hear of them as having established themselves in Narwar, some 50 miles to the south-west of modern Gwalior.

Here they remained about eight and a half centuries, and while they reigned here, one of the Kachhwāhā chiefs, named Suraj Sen, built the fortress of Gwalior.

The last historical event which brought them to the land which they now occupy happened in the

year 1128 A.D. In that year Dulhae Rae left Narwar to go to Dousa in order to be married to the daughter of the King of that place. Before departing on this errand he appointed his sister's son, named Paramāl Dyo, to rule in his place till he returned. The attractions of Dousa seem to have been so great that he delayed long enough to allow his nephew to usurp his place. As the King of Dousa had no son, and was desirous that his son-in-law should take his place after his death, it is probable that Dulhae Rae had no great desire to risk the doubtful issue of a contest with his nephew. At any rate he stayed on in Dousa, and there founded the Kingdom of the Kachhwāhā Rajputs in Dhundhār.

Eastern Rajputana was at this time distributed among petty Rajput chiefs, while the mountain strongholds were in the possession of the Minas, an indigenous people, who will be noticed later on. For an adventurous spirit like Dulhae Rae here was a fine field whereon to display his prowess. Māch, a fastness of the Seroh tribe of Minas, was not far off; this he took after strenuous fighting, and changed its name to Ramgarh after his great ancestor.

The next ruler, Kankal Rao, followed the policy of his father, and pushed on to Amber. This stronghold in a gorge of the hills was held by the Mina chief Bhatto, leader of the Susūwat Minas, and head of the Mina confederation. It was evident that to conquer this place was to obtain predominance over all the Mina tribes. Legendary story clusters round the sanguinary struggle which took place among

these rocky hills for the mastery showing that it was a life and death conflict ; but the Kachhwāhās came out the conquerors, and for some centuries Amber remained the capital of Dhundhār, the name, as has been already mentioned, by which the country conquered by the Kachhwāhās was at first known.

Succeeding rulers had enough to do in extending and consolidating the kingdom which had been won : but instead of dwelling on their exploits we pass on to Pajun, the sixth in descent from Dulhac Rae, because he came into touch with the Mussalman invaders of India, in connection with whom, in after years, the Kachhwāhās were to play so important a part.

Here for the sake of clearness we shall have to explain the situation of Northern India at this time. Mahimūd of Ghazni had swept over the land harrying it wherever he went. After him came the Afghan Shihāb-ud-din Ghori, who made himself undisputed master of the Punjab. Prithivi Raj or Rai Pithora, the last Hindu Emperor, a chivalrous lover and doughty champion, in whom was united the lordship of Ajmer and Delhi, was at that time endeavouring to unite the Rajputs against the Mussalmans, who threatened to overrun India. Pajun had married Prithivi Raj's sister, an alliance, says 'Tod, "perhaps attributable to the splendour of Pajun's descent added to his "personal merit," and was appointed one of his leading generals. In one of the many battles which he fought he defeated Shihāb-ud-din Ghori in the Kaiber Pass and drove him towards Ghazni. He met a soldier's death fighting for his

Paramount Lord in the five days' battle caused by Prithivi Raj's romantic attempt to carry off the Princess of Kanauj. There is another account of Pajun's death, but the local evidence is in favour of the narrative given above.

The limits assigned to us forbid us to attempt to describe the doings of the eleven succeeding Princes, although there is abundance of traditionary matter to show that they were not wanting in that energy and courage which characterised their race. We, therefore, pass over these, and come to Prithivi Raj: and we take up his history, because he is the first of those of the Amber Kings who were contemporaneous with the six great Moghul Emperors. Prithivi Raj reigned for three years after Baber crossed the Indus, and Sawai Jai Singh was ruling in Jaipur during the last seven years of Auranzeb's reign. The Jaipur chiefs, during the palmy days of the Moghul Empire, had abundance of scope for the exercise of their splendid talents, and made an enduring name for themselves in history. Quite a number of chiefs, besides the two above mentioned, ruled in Amber from the time of Baber to Auranzeb. Of Prithivi Raj this noteworthy thing must be recorded that, in the persons of his twelve sons he founded the twelve Kothris or houses of Jaipur. They are a landed aristocracy related to His Highness, the Maharaja, and are consulted on important matters of family or State.

Passing over a rather troublous period of twenty years, during which dissensions were rife in the family of Prithivi Raj, we find Bhār Mal, the son of

Prithivi Raj, seated on the Amber *gaddi*. The times were now changed. The great Moghul power was gradually spreading over the land. Amber territory lay between Delhi and Ajmer as well as Gujarat beyond, and if it were not to be swallowed up, the Chief must make friendship with the Emperor. Bhār Mal lived in the time of Hamayun and Akbar, and was the friend of both. He received from the Emperor Baber the Mansab or dignity of a commander of 5,000.

Bhagwān Dās succeeded his father, Bhār Mal. In his father's lifetime, he was made a commander of 5,000. This Prince was a distinguished warrior, and a man of great personal bravery. It is related of him that he saved Akbar's life at Sartāl. It happened that Akbar came up with Ibrahim Hussain Mirza, of whom he was in pursuit, at Sartāl. Ibrahim had 1,000 men under his command, Akbar had about 156 men, but they were Rajputs. Man Singh the son of Bhagwān Dās without hesitation charged this large body of men with his 156 troopers. "But he was so galled by the enemies' archers that he had to fall back, and halt in a lane formed by hedges of the prickly pear which did not admit of more than three horsemen riding abreast. In this situation three of the enemy's horsemen galloped up the lane, and attacked Akbar as he stood in front of his men. Raja Bhagwān Dās threw himself forward, and received one of the horsemen on his spear, dismounted him, and having instantly charged another, the remaining horseman fled, and was pursued by Bhagwān Dās and his brother."

Man Singh, the son and successor of Bhagwān

Dās, became king in 1590, and as Akbar died in the year 1605, Man Singh was the contemporary of Akbar for fifteen years. He commands our attention at once by the straightforward manly answer he gave the Great Akbar, when questioned by him, "Surely, I am a Hindu," was his reply. He was one of the greatest generals India has produced, and in Akbar's brilliant Court was peerless. So valuable did Akbar consider his services that he gave him the command of 7,000 troops, raising him thus above all the Muhammadan officers of the Empire. He was Governor of Cabul, and tamed the refractory tribes of that turbulent land. He conquered Orissa, governed Bengal, Behar and the Dakhan, and during his numerous campaigns he received grants of land in many parts of the Empire, which are still in the possession of the Jaipur Raj.

Mirza Jai Singh is the next king worthy of note. He was an ideal Rajput ruler. Brave and chivalrous he, with his Rajput legion, was dreaded by the crafty Auranzeb who ultimately compassed his death.

As Viceroy of the Dakhan he, in the fort of Poonadhar, besieged the renowned Sewaji, the Marhatta, who had so long and so successfully withstood the Moghul armies. A height was carried which rendered the fort untenable, and Sewaji, cowed and beaten, threw himself on the mercy of Mirza Jai Singh. Mirza Jai Singh pledged his faith for his security, and sent him to the Emperor at Delhi. Auranzeb made him a prisoner, but Mirza Jai Singh was too proud and too good a Rajput to break his word so solemnly given, and braving the wrath of the

Emperor connived at the Marhatta's escape. Aurangzeb's dastardly conduct in bringing about the assassination of Mirza Jai Singh has left a stain upon his name. |

As was noted before Sawai Jai Singh was king of Jaipur, during the seven last years of the reign of Aurangzeb, he distinguished himself in the Dakhan; but it was amid the confusion caused by the break-up of the Moghul Empire, that the splendid abilities of this Prince were to be exercised. He reigned thirty-seven years after Aurangzeb's death. The situation during that time was most extraordinary. The glory and power of the Moghul Empire were gone, and the fabric was going to pieces; from the south, the Marhatta hordes had begun their pillaging career; in the east the Jats were sullenly forcing their way into lands they had no right to; the virile Sikhs were coming into view in the Punjab; and when no one knew whither the struggle tended the dread form of Nadir Shah with his ruthless battalions appeared in Dehli. With this turmoil on all sides Sawai Jai Singh not only maintained his position, but extended the boundaries of his kingdom; and what is more found time for astronomical studies which have given him a European reputation.

Madho Singh I, the son of Sawai Jai Singh, by an Udaipur Princess, succeeded after the death of his elder brother, Isri Singh. He was a valiant and energetic Prince, but could do little as the country was so much harrassed by contending parties. However in his reign Jaipur acquired the strong and important fortress of Ranthambhor, and the town of

Sawai Madhopur was built near the fortress somewhat on the plan of Jaipur.

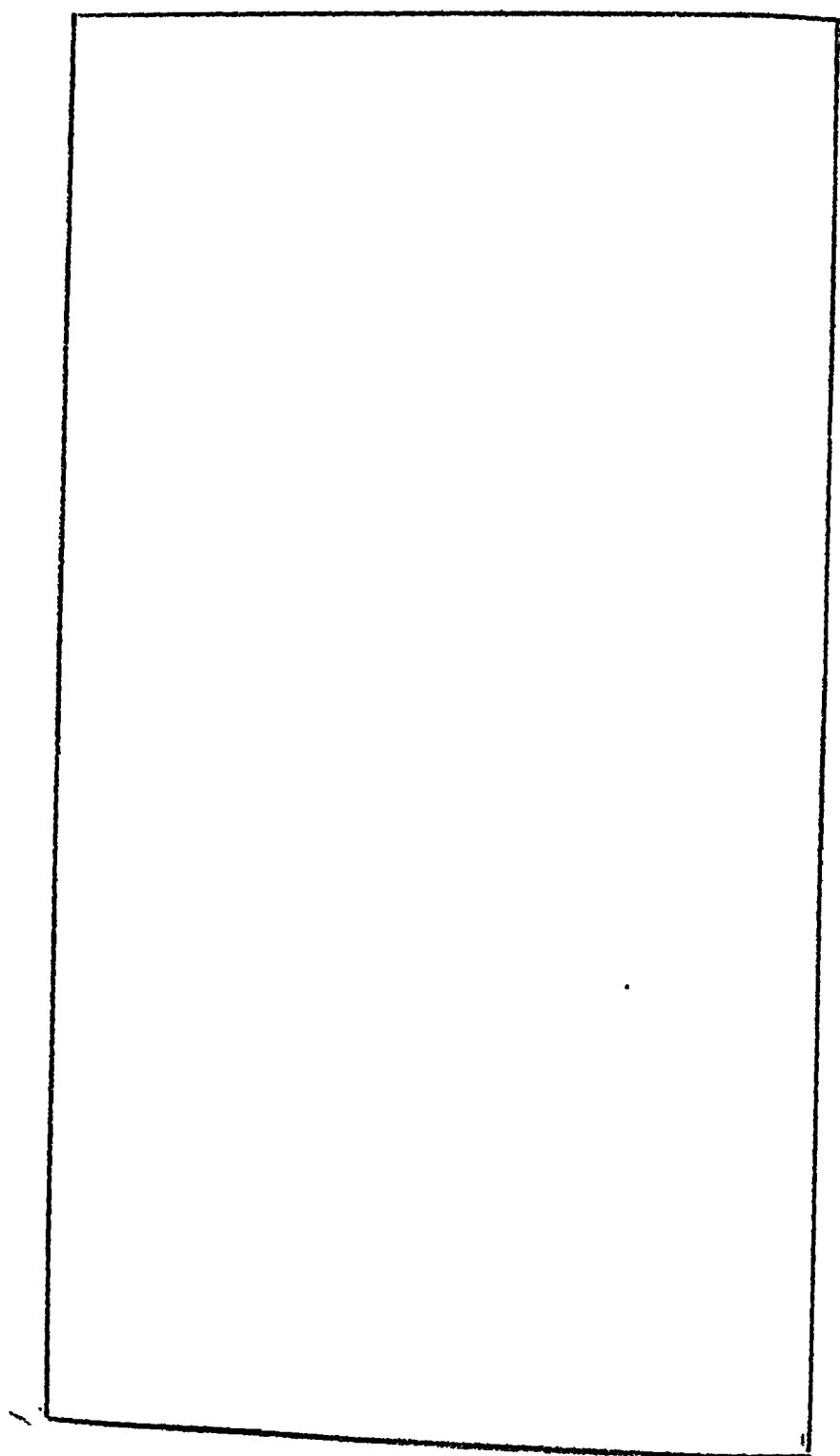
From the death of Madho Singh I to the beginning of the reign of Ram Singh in 1851 there is nothing of much interest to the general reader to record.

Ram Singh was "a ruler of singular intelligence and enlightenment." In the mutiny he rendered effective service to the Government. His army which marched in the direction of Delhi punished many of the refractory Mewati villages and rescued about thirty Europeans who were found in concealment on the line of march. For his services at this time he received from the British Government the district of Kot Kasim. He greatly improved the administration of the State, and paid special attention to the extension of Public Works.

Ram Singh died in 1880, and was succeeded by his adopted son, Madho Singh II, the present ruler. The Maharaja is worthy of the great men he has succeeded. His loyalty to the Supreme Government is strong, true and ingenuous. He maintains a Transport Corps, which is at the disposal of the British Government whenever it is needed. This Corps has been twice on active service.

During the terrible famine of 1899-1900, he did everything that could be done to save his people, and mitigate their misfortunes. So impressed was he with the suffering which he saw at this time that he founded the "Indian People's Famine Trust," and contributed to it first and last the large sum of twenty lakhs of rupees.

What he has done for his own State and for the country in general have been acknowledged by the British Government. He was created a K.G.C.S.I. in the year 1888, and a G.C.I.E. in the year 1901, and in 1903 he was created a G.C.V.O. He is entitled to a salute of twenty-one guns, the highest number allowed to any Prince in India. In 1908 he was presented with the honorary degree of LL.D. by the University of Edinburgh in recognition of the encouragement he has given to the Educational Institutions of his country. The Maharaja loves and cares for his people; and they know it, and love him in return. Long live the Maharaja !



CHAPTER III,

JAIPUR CITY.

1. Description of the City.

The City of Jaipur is the Capital of the State and the residence of His Highness the Maharaja. The Resident, as the Political Officer accredited to the State is styled, also has his head-quarters here. The City lies on the Rajputana-Malwa Railway and is 699 miles distant from Bombay and 150 from Agra. It is the largest city in Rajputana, the population being 160,000.

Jaipur was founded in 1728 A.D. by the well-known Maharaja Sawai Jai Singh II after whom it is named. A masonry crenelated wall about 20 ft. high and 9 ft. thick entirely encloses the City. There are seven fortified gateways, those most used being the Ajmer, and Sanganer *Pols* (gates) on the south, the Chand *Pol* to the west and the Ghat *Pol* to the south-east. The city is regularly laid out in rectangular blocks, the main streets being 111 ft. wide. The principal street which runs from the Chand *Pol* to the Suraj *Pol* and in which the entrance to the Palace lies is $2\frac{1}{2}$ miles in length.

There are various stories to account for the regular plan of the City. One is that the Observatory was the first thing made and that the Maharaja, following his mathematical bent, had the City laid

out with mathematical precision. Another account is that there was a shooting box and garden where the Alligator tank now is, and that the regular plan of the garden was copied in laying out the town; a further story has it that Constantinople was taken as a model, and yet another that the Chandni Chauk at Delhi gave the Maharaja his idea.

But however this may be, the result has been to produce what must be one of the most striking and remarkable cities in Asia. A notable feature is that the whole city is of one uniform colour, *viz.*, pink. This was not always the case. Originally the colour was white. Then the late Chief Maharaja Ram Singh tried colouring all the streets differently, green, yellow, pink, &c. Finally pink was adopted for the whole City.

The City is divided into *Chokris* or blocks, and the blocks into *Mohallas* or quarters. There are 407 *Mohallas*, and there is a Municipality of 26 members. Law and order are represented by a *Faujdar* (Chief Magistrate), two Assistant Magistrates and a Police force, 855 strong, under a *Kotwal* (Superintendent) and two Assistants.

The streets are lit by gas, the number of jets being 778, and water is supplied both from wells and from the Water Works on the Aman-i-Shah river. These supply some 800,000 gallons of water a day, the number of taps being 1,255.

The principal institutions and buildings will be found described under their respective heads, but the following may be mentioned here: (1) the Maharaja's Palace, embracing the Observatory (*vide* Appendix),

the Stables, the Armoury, the Private Library and the Alligator tank; (2) the Hawa Mahal; (3) the Maharaja's College; (4) the School of Art; (5) the Mayo Hospital; (6) the Albert Hall (Museum); and (7) the Jails.

A special feature are the beautiful Ram Newas Gardens just outside the walls. In the Gardens are the Albert Hall and the Mayo Hospital, as also a menagerie with a good collection of birds and animals.

The principal arts and industries are dyeing, carving in marble, enamelling on gold and silver, pottery and brass work. The Jails turn out excellent carpets. There is not much general trade, but there is considerable banking business, and the wealth of the City must be enormous.

There are two Steam Cotton Presses which press some 13,000 bales a year.

2. The Maharaja's Palace.

The *Sarhadd* as the Palace enclosure is termed, occupies the entire north-central block of the city and covers nearly a seventh of its total area. Besides the Palace proper the enclosure provides accommodation both for the personal establishments of His Highness and for all the State Departmental Offices located in the Capital, except those of the Medical, Educational and Public Works Departments.

The main gate known as the *Sirah Deorhi* faces the east, as it should do with a people descended from

the sun. The Palace, however, is usually entered by its southern gate called the Tripolia (triple gate), which leads out of the principal road of the city.

The second gate leads into a square, on the left of which are the entrances to the *Zenana*, the Stables, the Kitchen and the temple of Brajanandji, while on the right is the temple of Anand-Krishnaji and the Astronomical Observatory.

The third portal is known as Purbia-ki-Deorhi. All Jaipur subjects must dismount here from their conveyances and proceed the remainder of the way to the Palace on foot. It opens into another square, in the centre of which stands a fine structure in Jaipur marble. On the north side of the square is the Saraj-ki-Deorhi or the Screen Gate, the gigantic brass doors of which are of unique and remarkable construction. Inside is a paved court in which stands the Sarbata or Diwan-i-Khas. In this Hall, the Maharaja holds his Darbars on all ordinary occasions and here also he gives his State dinners.

Beyond the Sarbata to the East a gate leads to another and larger courtyard containing the Sabha Newas or Diwan-i-Am. A small gate on the west side of the Sarbata, called Ridhsidhpul, leads to the court in the rear of Chandra Mahal or principal Palace, which faces the extensive Gardens.

The Chandra Mahal which towers proudly above all the surrounding buildings is a seven-storied structure. On the ground floor is the Chandra Mandir and Pitam Newas—a winter chamber glazed with talc. On the first floor is the Sukh Newas, which is richly decorated with floral designs. The portion of it next

the gardens is covered with quaint paintings of much interest. The second floor is called the Rang Mandir or Hall of Pleasure, the walls and roof of which are adorned with mirrors. The Sobha Newas or Hall of Brilliancy comes next, then the Chhabi Newas and still higher up the Sree Newas. At the summit is the Mukut Mandir or Crown Palace, from which a grand view of the town and the surrounding hills and forts is obtainable.

Looking to the north the visitor can see the great temple of Govindji, between the upper and the lower gardens the Badal Mahal or the Cloud Palace on the border of Talkatora, the Palace Lake, and the distant walls of Amber. On the west, beneath the Nahargarh Fort, lies the Parade ground, and on the east and south, beyond the town, are the gardens of wealthy inhabitants.

The private Library and Armoury, with their invaluable treasures, are placed in buildings immediately to the south of the Chandra Mahal Court.

The principal entrance to the Palace, as already stated, leads from the road lying to the east of the Sarhadd, through a series of seven colossal gateways, which form the Royal Entry of the Palace, and the only one that is considered auspicious for ceremonial occasions.

The Kapat Kot-ka, or Bandarwal-ka-Darwaza, is the first portal of the series. Next comes the Dundubhipol, or the Drum Gate or Nakkar Khana-ka-Darwaza, and leads the visitor to the great Public Offices square, the Jaleb Chauk. The third portal is the Udaipol, better known as the *Sirah Deorhi*, beyond

which carriages do not ordinarily pass. Then come the Bijayapol, the Jayapol and the Ganeshpol, that lead to the Court of the Diwan-i-Am. The last of the series is the Ambapol that connects this Court with that of the Diwan-i-Khas.

In front of the main entrance to the Chandra Mahal and to the north lie the palace gardens known as the Jai Nwas Gardens.

At the end of the Upper Gardens, or just in the centre of the Upper and Lower Gardens, stands the temple of Shri Govindji, which contains a very famous image of Krishna, and beyond Govindji's temple comes the Nichla Bag or the Lower Gardens.

At the northern extremity of these gardens stands the Badal Mahal or Palace of Clouds.

To the west of the gardens and approached by the Gangori Gate, there is a large square where on the occasions of important festivals, as the Gangor or Tij, large crowds of people assemble to witness displays of horsemanship, and finally the passing of the processions connected with the respective festivals.

3. The Armoury.

The Armoury is approached from the inner courtyard of the Palace, and is only to be seen by His Highness' special permission. It contains many thousands of arms of every variety, and covering many centuries of Indian history. There are swords, shields, spears, bows, matchlocks and modern firearms, khattars and other daggers. Many of the

swords are Persian, and among them are blades of rare workmanship and priceless value. Rajput arms of course predominate, and the sight of them enables the mind to picture without any great effort of the imagination battles and forays and deeds of chivalry and valour which not so long ago made up the life of the Rajput Chief and his nobles and followers. Nor is the spirit of his ancestors dead in the Rajput of to-day. Under the *Par Britannia* there is not much scope for deeds of arms, but the Rajput nevertheless remains what he always was, a born soldier and a gallant warrior.

4. The Maharaja's Library.

The Pothikhana or Library is in a room near the Armoury in the private part of the Palace, and it can only be visited by His Highness' special permission.

It contains many treasures in the way of old books, maps, pictures and astronomical instruments.

Among the books the most noteworthy is a version in Persian of the great Hindu epic, the *Mahabharata*. The writer or translator is Abul Fazl, the famous poet of Akbar's reign. The work is all hand-written, and that so beautifully as to put to shame the most improved type of the present day. It is profusely illustrated by the hands of all the most famous artists of the time. There are four volumes, and the whole work is one of exquisite beauty and of fabulous value.

The maps too are full of interest as showing what the state of cartographic art was in India two or three centuries ago. There are maps of Amber and the surrounding country, a map of the Punjab (evidently prepared for Raja Mān when proceeding to the conquest of Kabul), a map of Ujjain, of Delhi, of Agra, of Muttra, &c.

The pictures include paintings of the Mogul Emperors of Delhi, of the various Chiefs of Amber and Jaipur, of the battle of Sambhar and of Nadir Shah ordering a general massacre of the people of Delhi.

In an upper story room are stored and preserved some of the original astronomical instruments as prepared and used by Maharaja Sawai Jai Singh.

5. The Alligator Tank.

The Talkatora (Cup Lake), or as visitors call it the Alligator Tank, lies at the northern extremity of the Palace Gardens and immediately beyond the Bādal Mahal. There was always a lake in this place, and in the days when Amber was still the Capital the forests about the lake provided a favourite hunting ground for the Chiefs. What is now the Bādal Mahal was then a *Shikar Odī*. This Palace may therefore claim to be the oldest building in Jaipur. The tank is now crowded with alligators. These are regularly fed at the Darbar expense. They are quite

tame and come up the steps of the tank to receive food from the hands of the attendants.

A pastime occasionally indulged in is the feeding of the alligators with a bait tied to a long rope. This is thrown out into the tank and there is soon a battle royal for its possession. The successful combatant having bolted the bait, rope and all, a tug-of-war ensues between him and the men holding the rope. It takes many men to haul the monster on shore. Finally he bites the rope through and escapes.

There are other and more attractive scenes to be witnessed, at the Bādāl Mahal, for it is here that His Highness holds Darbars on the occasion of the Gangor and Tij festivals, and it is from here that the procession starts. Nothing can exceed the charm and beauty of the ceremonials connected with these festivals. A leading feature is that on each occasion a different colour is prescribed, and all taking part must be dressed accordingly. The scene in a large Darbar hall full of nobles and officials all dressed in red and all decked out in their finest jewels is one not easily forgotten.

6. The Stables.

The *Atish* (from the Turkish word *Aat*, a horse) or stables are in the long street running east and west, the entrance being near the Tripolia gate. They are placed round three sides of an extensive court-yard some 200 yards long.

Only saddle horses are kept here. The number is about 300, consisting of Arabs, Walers and country-

breeds. Among the latter must be classed the beautiful Marwari horses. The Darbar have some fine specimens, but the breed unfortunately seems to be gradually dying out, much as in Baluchistan the fine breed of Baluch horse is disappearing.

The horses are well looked after, and as they get regular exercise, either in the court-yard which is tanned for the purpose or elsewhere, they are in good working condition and are not the fat, useless creatures sometimes met with in Darbar stables.

At the near end of the enclosure is a handsome pavilion where on occasion visitors are seated and shown various feats of equitation and of equine cleverness. An interesting feature of the stables are the rooms containing the horse furniture used on State occasions. It is all very magnificent and costly.

The annual cost to the Darbar for the maintenance of these Stables is about one and a half lacs of rupees. This does not take into account the cost of carriage-horses, which come under a distinct department.

Mention should be made here of the high tower that rises above the stables and the adjoining street; it is known as the Ishari Lat, but is also called the Swarga Suli (Heaven-darting). It is said to have been built by Maharaja Ishari Singh to enable him to overlook the whole city and see for himself what was going on.

7. The Ram Newas Gardens.

These fine public gardens lie to the south of the

City and just beyond the Ajmer Gate. They are always open and are free to all comers.

The Albert Hall (Museum) and the Mayo Hospital are situated within their limits, while the menagerie and the aviaries are also special features. For a further description of the gardens see Chapter V., page 76.

8. The Albert Hall and Museum.

The Albert Hall stands in the Ram Newas or Public Gardens of Jaipur, immediately to the south of the City. The foundation stone was laid by His Majesty King Edward the VIIth (then Prince of Wales), on February 6th, 1876.

It was intended by His Highness Sir Sawai Ram Singh, G.C.S.I., that this magnificent edifice should be a permanent memorial of the visit of his illustrious guest to his capital. The foundations and plinth were well advanced before his death in 1880, but the superstructure has been constructed during the reign of the present Chief, Colonel His Highness Sir Sawai Madho Singh, G.C.S.I., G.C.I.E., G.C.V.O., LL.D. Colonel Sir Swinton Jacob, K.C.I.E., the late State Engineer at Jaipur, was the architect. The building is in the Indo-Saracenic style, with the modifications which were necessary to adapt it for use as a Museum and for modern purposes of a public nature. The total cost amounted to nearly five lakhs of rupees.

The attention of visitors is particularly directed to the details of the stone carving, which in many

instances are careful reproductions of well-known examples of decorative work in the palaces and tombs of Rajputana, Delhi, Agra, and Fatchpur Sikri.

The central hall is used as a lecture or Darbar room. There is a large portico, which is adorned with careful reproductions in distemper of contemporary portraits of the Maharajas of Jaipur from 1503 A.D. to the present date. On panels over the arches of the adjacent Courts, Colonel Jacob has caused mottoes to be engraved from the most renowned Indian classical works. The translations into English will be found on the corresponding panels inside the corridors.

The whole of the remaining rooms, corridors and galleries are devoted to the Museum, which was formally opened, in its present home, by Sir Edward Bradford, in February 1887.

There was a small Natural History Museum in Jaipur in the time of the late Maharaja, but, as it failed to give satisfaction, he abolished it.

The present institution was established in 1881 as an Economic, Educational, and Industrial Art Museum. All expenses connected with it are met by His Highness the Maharaja. The average yearly attendance of visitors is 2,52,000 persons. The outer walls of the Museum rooms are covered with large pictures in distemper. These are intended to indicate the different influences which may be supposed to have been at work in forming the Indo-Persian or present style of local art.

In the central corridor will be found six reproductions from the *Razmnamah*, a famous work of the time of the Emperor Akbar. The originals were

prepared at the best period of the Indo-Persian School.

On the east of the building there are copies of well-known pictures from China, Japan, Assyria, Chaldea, and Persepolis, as well as examples of ancient Egyptian art. On the west are two specimens of reproductions of the frescoes at the Ajunta Caves, which represent the pure Hindu style. There are others from the Roman, Byzantine, and ancient Greek schools to illustrate the Aryan influence.

The Museum is entered by a turnstile at the south-east corner of the east court. The collections will be briefly described in the order in which they may be most conveniently examined.

The Industrial Art Exhibits are arranged on the ground floor. The first room contains examples of metal ware. In the floor cases are shown those articles which require minute examination, while the wall cases are generally reserved for such objects as are interesting for their forms, or to complete the history of a particular branch of the Art. The textiles displayed in these cases, and in the wall and revolving frames, are all enriched with metal. The first case on the right contains a synoptic or key collection of Indian Arms, because nearly all decoration in India was first applied to the ornamentation of weapons. In one of the cases electrotypes of rare and choice examples of metal work from foreign countries and of different periods, are exhibited, with the view of showing the Jaipur artists what have been considered masterpieces in past ages, and in parts of the world outside India.

In the small adjacent rooms old specimens of indigenous metal work have been placed for the same purpose. Round the walls of these rooms will also be found a number of frames containing a collection of peasant jewellery in base metal, because the oldest forms of ornament are found on such articles.

A collection of duplicates of Jaipur exhibits in the Imperial Institute, London, in brass and other metals, and sacrificial utensils and metal work bought at the Punjab Exhibition of 1893-94 is shown in one of the smallest of the three metal rooms, and close at hand the visitor will find electrotypes of Indian coins from the earliest down to the fall of the Moghul Empire, with charts and maps descriptive of them and of the history of India.

In one of the large cases in the second room a completely representative collection of Egyptian antiquities, which was made by His Excellency Brush Bey of Cairo, has been arranged.

As all the articles are genuine, and have been selected by so learned an authority, they may be considered to sufficiently illustrate a most interesting subject. The mummy of a priestess is also shown in a case which was designed to imitate a funeral canopy, and in the central hall of the building will be found photographs of the most valuable objects in the great Museum at Cairo.

The central hall being larger than the others, has several extra cases and two large pillar stands of revolving frames.

Wood-carving from many districts, ivory inlay,

ivory carving from all parts of India, Venetian glass, lacquer work, garnet jewellery, photographs and paintings, and miscellaneous articles of all kinds are shown in this room. Amongst the most prominent exhibits are the brass astronomical instruments and the terrestrial globe of Maharaja Sawai Jai Singh, the founder of Jaipur, which have been kindly lent from his private collection by His Highness the Maharaja himself; a series of impressions from each stone showing the mode of producing high-class chromolithographs; all the photographs issued at the close of the Lahore and Simla Art Exhibitions; the illustrations of Sir G. Birdwood's Art Manual; views of the principal places of interest in the Jaipur State, and of famous buildings in Rajputana and Central India—all by native artists.

In the corridors behind this room and between those on the east and west, there are cases containing papier maché models of the heads of Jaipur people, each wearing an appropriate turban and having sectarian marks proper to the special castes; also basket work, pith models, and wood carving inlaid with ivory or wire. There are also pillar stands carrying revolving frames, which are devoted to the exhibition of small textiles, lace, coloured photographs, etc., and the walls are hung with carpets and floorcloths. A fine copper vase decorated with designs from the caves of Ajunta is also shown.

In the great west room are shown Oriental porcelain, pottery and lacquered ware. There are a few good examples in this, as in all the rooms of European Artwork, which are placed here for the study of

artists. No European forms are allowed to be copied. All good specimens of Indian Artwork are freely lent to the local workmen for reproduction.

The small rooms at this end of the building are set apart for the exhibition of clay models and of stone carving, particularly of images which Jaipur exports to all parts of the Hindu-Brahmanical world. A complete set of mythological figures in stone and brass, and sacrificial appliances, and mythological paintings illustrative of the Hindu Pantheon, has been provided, because mythology is the key to Hindu Art.

The upper floor of the Museum is set apart for the Educational, Scientific, and Economic sections.

At the top of the staircase Zoological collections are arranged. They may be classified somewhat as follows:—

1. A synoptic or key case containing accurate models, all on the same scale, of typical representatives of the fauna of the world, arranged in their natural surroundings.
2. Similar pictorial representations of the animal kingdom.
3. Beautiful glass and enamel models, by Herr Blaschka of Dresden, of the invertebrata, to illustrate the lowest forms of life up to the mollusks.
4. A type collection of shells, and a special series of Indian shells.
5. Insects of all kinds, each class being illustrated as far as possible by Indian examples.
6. A good stuffed specimen of each of the different classes of birds, reptiles, and animals, in most

cases with a skeleton placed by its side, and mounted in a similar position. A Paris model showing the anatomy of each order. There are large models of a man, a horse, and a turkey. The models of the horse will be very useful to native veterinary surgeons.

7. Models to show how the processes of life are carried on in all branches of the animal kingdom, divided into the following classes :—

1. Digestive system.
2. Organs of circulation.
3. Nervous system.
4. Organs of special sense, such as the eye and ear, on a large scale.

8. Collections to illustrate special subjects, such as the poisonous snakes of India, the silk worms, &c. Similar models, also by Dr. Auzoux, are shown in the botanical section.

In the Eastern galleries, miscellaneous and educational models and maps are shown, and in a corridor behind the great hall, plaster casts of Bactrian sculptures, the originals of which are at Lahore. Indian textiles of all kinds are also to be found in the upstairs galleries, as well as the economic products of the province of Rajputana.

NOTICE TO VISITORS.

1. After they have examined the collections, visitors are requested to write their names in a book kept for the purpose.

2. To leave their sticks and umbrellas with the attendants at the entrance turnstile.

3. To consult the clerk or demonstrator on duty in case of difficulty, or if they want information.

4. If they desire any special article to be copied, to point it out to the demonstrator, who will place it at the disposal of the Principal of the School of Art for this purpose.

Sales are not conducted in the Museum, as specimens of all kinds of local work can be procured at the School of Art, or at the sale rooms of Jaipur curio dealers, especially of Messrs. Zoroaster & Co., and Messrs. Nur Bux & Co., in the Bhumia Rasta.

6. The Honorary Secretary will always be happy to answer any special enquiries, and will be glad to receive any suggestions, or to hear any complaints.

The Museum attendants are absolutely prohibited from receiving gratuities.

A Museum Handbook has been published, and can be purchased in the Museum. Catalogues have also been printed.

9. School of Art.

The School of Art was opened in 1866 by H. H. Maharaja Sewai Ram Singh. Dr. C. S. Valentine was the first Principal, and began the School with a staff of teachers sent from the Madras School of Art. Surgeon-Major W. F. DeFabeck, I.M.S., was in charge from 1869 to 1872; Mr. James Scorgie of the Bombay Education Department from 1872 to 1874, and Mr. Opendro Nath Sen from 1875 to 1907, when he died here. His son is in charge at present.

Unlike the Schools of Arts in the Presidency

towns, the Durbar wished to make it more a School of Industrial Art than of the Fine Arts; hence all those branches of Industry, for which Jaipur is particularly noted, received special attention at the time of the organization of the School: but at the same time Drawing and other branches of the Fine Arts, best calculated to refine and improve the taste of the people were not neglected.

The course of instruction was to be altogether of a practical nature. In the terms of the Prospectus "it was intended that the School should be supplied with Drawings, Models, Chemical and Philosophical Apparatus and Machinery. That it should possess a Museum, well furnished with specimens for the study of Natural History, Mineralogy and Practical Geology." Attached to the school there were to be Workshops, where practical instruction would be given to the students and where works of various kinds might be executed for the general public.

The Museum in the Albert Hall contains much that can be useful in this way, and visitors can have reproductions made of many of the articles if they wish it. There is a show-room attached to the School for the sale of the various articles manufactured.

Education is given free of charge, and scholarships are granted to deserving students.

The Staff consists of the Director of Education, the Vice-Principal, four assistants and fourteen teachers.

Instruction is given in the following subjects:
(1) Drawing and Painting, (2) Modelling and

Pottery, (3) Electroplating, (4) Engraving, (5) Sculpture, (6) Turnery, (7) Carving in wood and stone, (8) Koftgari, (9) Carpentry, (10) Blacksmith's and Fitter's work, (11) Enamelling on gold and silver and brass, (12) Brass work, (13) Silver repousee work, (14) Bookbinding.

The total number of students on the roll is 80, the average daily attendance 70.

The average annual grant for the maintenance of the School is about Rs. 9,000.

An illustrated Catalogue of articles made in the School can be had on application to the Principal.

The School of Art is open to visitors from sunrise to 10 or 11 A.M. in summer, and from 10 A.M. to 5 P.M. in winter.

10. The Mayo Hospital.

The Hospital is situated in the Ram Newas Gardens immediately in front of the Sanganir Gate of the City. The institution is worth particular attention, both for the sake of the fine edifice in which it is located and for the completeness and excellence of the arrangements. The people of Jaipur have reason to be grateful to the Chief that provides them with so great a boon.

Additional notices regarding the hospital will be found under the "State Public Works Department," page 74, and "The State Medical Department," page 79. Hard by the hospital stands a statue of Lord Mayo, bearing the following interesting inscription:—

THIS STATUE IS ERECTED BY

HIS HIGHNESS SARMADE RAJAHAT HINDUSTAN RAJ
RAJENDRA SRI MAHARAJA DHIRAJ THE HONORABLE SAWAI RAM
SINGH BAHADUR, G.C.S.I.,

AS A TRIBUTE TO THE MEMORY OF HIS MOST ESTEEMED AND
LAMENTED FRIEND,

The Right Honorable

Richard Southwell Bourke,

Baron Bess of Bess, Viscount Mayo of Mayo
Croker, Sixth Earl of Mayo, K.P.D.C., M.D., C.M.S.J.,
Viceroy and Governor-General of India.

Whose able administration and brilliant career from 1869 to 1872 were marked by wisdom, justice and benevolence, and whose affable conduct, kind disposition, and earnest endeavours to do good to the millions of Her Majesty's subjects in India, won for him the sincere regard and affection of the people. Indefatigable in the performance of his duties he personally visited all the distant parts of Her Majesty's Indian Empire, not forgetting even the territories of the Native Princes, whose interest he always had at heart.

He signalized his tour through Rajputana in 1870 by many an act of benevolence, and endeared his name to every one connected with that part of India.

Alas! he fell a victim, in the prime of life, deeply regretted by all, to the cruel hand of an assassin, whilst discharging his duties as a public servant, at Hopetown, in the Andaman Islands, 8th February 1872.

11. The Maharaja's College.

This is one of the most important institutions in the State. The College building is an imposing structure standing at one corner of the Sangani Chouk (Square) and immediately opposite the Hawa Mahal. The building was at one time a temple.

The College hours are from 10 A.M. to 3-30 P.M. in winter and 6 to 10 A.M. in summer, and visitors can be shown over the institution on sending in their cards between these hours to the Principal, Baboo Sanjivan Gangoli, M.A. An account of the origin of the College and of the work it does, will be found under "Education in the Jaipur State," Chapter VII, page 84.

12. The Public Library.

The Jaipur Public Library was founded by the late Maharaja Sawai Ram Singh in 1866, for the benefit of the Maharaja's College and of the educated public in Jaipur.

It was reorganised and placed on its present footing in 1881, chiefly through the joint exertions of the late Vice-President, Babu Mahendra Nath Sen, and Colonel T. H. Hendley, C.I.E., the then Residency Surgeon. The Library contains works on various subjects in English, Sanskrit, Hindi, Persian, Arabic and other languages.

The total number of volumes is about fifteen thousand.

A considerable number of newspapers and periodicals are also subscribed for and made available to the Public.

The Library is open to the public from 7 to 10 o'clock in the morning and from 2-30 to 5-30 o'clock in the afternoon throughout the year, except on Sundays and general holidays.

A peon is always on duty at the Library, and visitors desiring to see the premises out of hours or on holidays can be shown round.

The Library is free to the Public, and all expenditure is borne by the State. Besides certain special grants that are made for particular purposes, there is a standing budget grant of Rs. 2,500 a year for the purchase of new books and other expenses connected with the upkeep and management.

The affairs of the Library are conducted by a Committee consisting of a President, a Vice-President and nine ordinary members, assisted by the Librarian, who is ex-officio the Secretary of the Committee.

13. The Hawa Mahal.

This is a remarkable structure built in the Saracenic style that stands at the corner of the Sanganir Chopar (Square) of the city.

Sir Edwin Arnold describes the Hawa Mahal as "a vision of daring and dainty loveliness, nine stories of rosy masonry and delicate overhanging balconies, and latticed windows, soaring with tier after tier of fanciful architecture in a pyramidal form, a very

mountain of airy and audacious beauty, through the thousand pierced screens and gilded arches of which the Indian air blows cool over the flat roofs of the very highest houses. Alladin's magician could have called into existence no more marvellous abode, nor was the pearl and silver palace of the Peri Banou more delicately charming."

The building is nine stories high, and a very fine view is to be had from the top. Behind the outer face there is a large and comfortable place where the Durbar accommodates guests of importance.

14. Jails.

There are two Jails in Jaipur: The *Sadar* or Central Jail; and the Chandpol or District Jail.

The Central Jail was built about forty-five years ago, and lies to the east of the Ram Newas Gardens.

The District Jail was completed some seventeen years ago. It has been constructed and arranged on the most modern plan. It is situated on the road from the Railway Station to the Chandpol Gate.

The daily average number of prisoners in the two jails during 1908, was 928.53; of these about 92 per cent. were males and about 8 per cent. females. The average daily number of juveniles is very small, not generally exceeding 10 or about 1 per cent. of the total number of prisoners:

There is separate provision in both jails for male and female term and under-trial prisoners.

The female portion of the Central Jail is almost a separate jail in itself, and is a model of completeness with its own cells, hospital, latrines, bathing platforms, worksheds &c.

Throughout both jails the wards are spacious and airy, and sanitary arrangements are attended to with the greatest strictness. The regulation amount of sleeping space is allowed for each prisoner, *viz.*, 50 square feet or 648 cubic feet. The health of the prisoners is usually good and the death-rate is no more than 15 per 1,000.

There is one cook-shed in each jail, in which arrangements are made to cook separately for each class of prisoners according to castes. Each convict is allowed twelve chhataks (one chhatak = 2 ozs.) of atta, two chhataks of dal and two chhataks of fresh vegetables, together with the necessary quantities of salt and condiments. Two meals a day are issued, *viz.*, at 10-30 in the morning and at 5 in the afternoon.

The Jail staff consists of Rai Sahib Naurangrai Khetan, Superintendent, two Darogas, two Naib Darogas, two Hospital Assistants, one Supervisor of Finger Impression and 99 other clerks, overseers, warders and menials.

The prisoners chiefly consist of Minas, Rajputs, Brahmans and Muhammadans with a sprinkling of other castes.

The principal crimes for which the prisoners are sentenced are : theft, bad livelihood, assault, rioting and criminal trespass.

The majority of the prisoners are under sentence of terms of from one month to two years.

About 14 per cent. of the prisoners are employed on out-duties in gardens, &c., while the rest are given work within the walls.

The Jail Industries comprise carpet and darri making and cloth weaving. The carpet industry has obtained a high degree of excellence, and the carpets turned out here are much in demand both in India and in Europe and America. Persian, Turkish and Central Asian designs are copied. The prices of woollen carpets vary from Rs. 10 to Rs. 22 a square yard. Bikaner wool, which is the best obtainable, is largely used in the jail.

Pile carpets are also made of cotton. They are of all designs, and they are sold at Rs. 5 per square yard.

The cotton durries turned out too are of excellent quality and design. They are priced at Re. 1-4-0 a square yard.

The profit to the State from jail manufactures amounted to Rs. 30,000 in 1908.

These two jails and the Lunatic Asylum (which is also under the supervision of the Superintendent of Jails), are maintained by the Durbar at an annual cost of about a lac of rupees.

Besides the Superintendent, the Lunatic Asylum staff consists of one Daroga, one Hospital Assistant and fourteen clerks, warders and menial servants.

The Superintendent of Dispensaries and Vaccination, Jaipur State, Jaipur, is ex-officio Medical Officer of the Jails and the Lunatic Asylum.

Permission to visit the jails can be obtained from the Superintendent either by letter or on visitors presenting their cards at the gates.

15. The Church.

In 1875 the Jaipur Durbar gave a site of about 17 bighas of land and a grant of Rs. 3,000 towards the Building Fund of the Church here. The Government of India gave a grant of Rs. 5,000, on the understanding that the Church became the property of Government (letter No. 194 B dated 24th June 1875 from the Government of India P. W. D. to the A. G. G.). The foundation stone was laid during the Episcopate of Bishop Milman, Metropolitan of India, who took an interest in the work, and secured a grant of Rs. 1,000 from the Church Building Fund, and sent a liberal contribution himself. It will accommodate 100 persons.

The building was first opened for Divine Service on Christmas day 1876, and was consecrated on the 4th August 1878 by the Most Rev. Dr. E. R. Johnson, Bishop of Calcutta, and is named "All Saints."

It was decided by the Foreign Department of the Government of India (letter No. 679 I.G., dated 5th July 1880 to the Honourable the A. G.-G. for Rajputana) that the affairs of the Church at Jaipur should be administered by a Committee acting under the rules in force in British Territory.

Ajmer and Jaipur were originally considered in the Diocese of Calcutta, but since the Bishopric of

Nagpur has been established, both have been included in the latter Diocese.

At first the Chaplain of Ajmer visited Jaipur once a month, latterly a Chaplain, whose headquarters are at Bandikui, has done so.

A register is kept in the vestry in which the services—the names of those who officiate, the number of the congregation, and all matters of interest connected with the Church, are entered.

The building itself is in the early English style with certain additions to make it suitable to this country.

The nave is 55' x 16', the chancel 14' x 12', the apse 19½' x 8'.

The vestry (12' x 8') is on one side of the chancel, the organ room and bell chamber (12' x 8') on the other. They are separated from the chancel by an open arch with a brass rod and curtain. The entrance from the side aisles are through small marble archways, with foliated mouldings, and polished green marble pillars at the sides.

The names of the Chaplains, the dates of their service, and facts connected with the history of the Church are recorded on the walls of the vestry. The side aisles 8 feet wide, form passages; they are separated from the nave by arched openings, the pillars are of polished red marble with cut stone caps and bases. Foliated bands of polished white marble are being now put round the caps, thanks to the suggestion and generosity of a visitor here in the cold weather 1908-1909 (Sir Tatton Sykes).

The windows in the aisles are protected outside

from the sun and glare by projecting sunshades of slabstone; galvanised wire netting is stretched from the outer edge of the sunshade to the ground on each side of the opening. Creepers grow up to the wire netting and hang over the sunshade, forming an evergreen outer screen which keeps the walls cooler and has a pleasing appearance from the inside as well as from the outside. On the inside, window seats are provided in the recesses. The Altar, the Font, the Lectern and the Pulpit are of local marble, all made here. The only wood in the Church is in the main entrance doors and for the seats. The roof is of stone slabs, resting on drop arches, which spring from corbels above the nave pillars.

The apse windows are in stained glass, the centre one is to the memory of Bishop Milman, the subject being "The Good Shepherd." The side lights are to the memory of members of the late General Beynon's family, and the quatrefoils, in the side windows, are erected to his memory by his children. The walls of the apse are decorated in colour. Suitable texts are on the walls and over the chancel arch.

There is one Mural Brass to the memory of Lieutenant-Colonel Tate of the 15th B. C., who was sometime here as Inspecting Officer of Imperial Service Troops. The greater portion of the floor of the Church is paved with slabs of local marble polished.

A peal of eight tubular bells is provided in the turret. These were supplied by contributions from

the congregation in 1891; they can be rung by one person in the bell-room on the ground floor.

There is an entrance doorway on each side protected from the sun and rain by a porch 7' x 6' in which seats are provided on each side.

The original cost of the Church was about Rs. 21,000, but additions have been made since.

The Roman Catholic Church is situated near the Ghat gate of the City.

It owes its existence mainly to the liberality of General Victor Law, who was Political Agent here at one time.

It is well built, and the inside is decorated simply but in good taste. Rooms for the resident Priest and an Assistant are attached to the building. Services are regularly held here.

16. Hotels.

Fifty years ago there was no suitable place, either within or without the City, where the traveller could stay with comfort and convenience. The old serais, badly managed by their proprietors without any regard to cleanliness and rules of sanitation, were the only available places of rest. Later when the trunk road from Agra to Ajmer was constructed, it was thought expedient to provide staging bungalows at suitable distances for the use of travellers. Thus a Dak Bungalow was provided for Jaipur.

With the opening of the Railway line visitors began coming in large numbers, and the old Dak

Bungalow was no longer sufficient. In 1882, therefore, the Darbar sanctioned the opening of the Kaiser-i-Hind Hotel as a private enterprise, while the Dak Bungalow was also converted into a hotel under the name of the Jaipur Hotel.

The first is situated a few hundred yards from the Railway Station, and the second between the Station and the Ajmer Gate of the City adjoining the Government Telegraph Office. Both are under Darbar supervision and are well managed, comfortable institutions. The charges range from Rs. 5 to Rs. 7 per diem.

Carriages and elephants (for Amber) are supplied by the Managers, and English-speaking guides are always available.

17. The Principal Shops.

There are in Jaipur a large number of shops that deal in articles likely to be required by visitors.

The following are some of the best known, with their addresses and a summary of the articles they sell. The prices at these shops are said to be fixed prices. Complaints against the owners, if found to be necessary, should be made in writing to the Foujdar (City Magistrate), Jaipur.

For Jewellery and Precious Stones, Enamelled Work, &c.

1. MESSRS. PHULCHAND KASHINATH, Gopalji-ka-Rasta.
2. MESSRS. SUGANCHAND SOBHAGCHAND, Jewellers, Johri Bazar.

3. MESSRS. GULANCHAND LUNIA & Co., Jewellers,
Johri Bazar.
4. THE SCHOOL OF ARTS, Kishenpol Bazar.

For Brass, Embossed Work, Steel Damascene Work, Indian Arms, Ivory and Sandal-wood Toys, Lacquer and Paper Maché Work, etc.

1. THE SCHOOL OF ARTS, Kishenpol Bazar.
2. MESSRS. S. ZORASTER & Co., Motisingh Bhomia-
ka-Rasta, Johri Bazar.
3. MESSRS. GOBINDRAM & OODEYRAM, Chandpol
Bazar.
4. MESSRS. NURDUKSH & KHUDABUX, Tripoli
Bazar.
5. MESSRS. P. M. ALABUKSH & Co., Chaura Rasta.

For Carpets and Durries.

1. The Central Jail Workshop.
2. MESSRS. S. ZORASTER & Co.

For Photographs, Paintings, etc.

1. MESSRS. GOBINDRAM & OODEYRAM, Chandpol.
Bazar.

For Gold and Silver Embroidery, Old Arms (genuine and imitation), Ancient Coins and old Brass Work.

1. MESSRS. S. ZORASTER & Co.
2. MESSRS. NURDUKSH & KHUDABUKSH.
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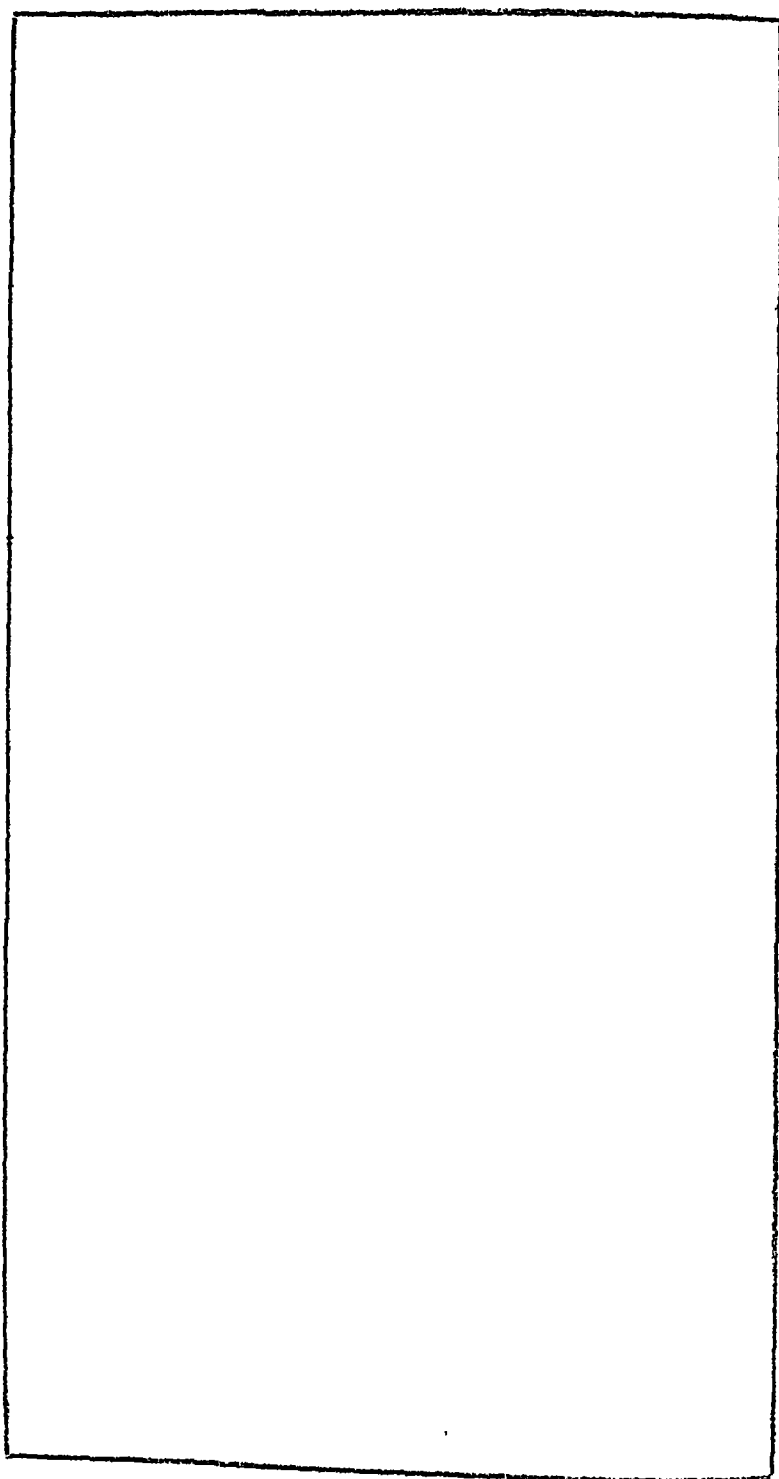
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For Namdas, Durries, etc.

1. KHAJOORAM, SON OF JAGANNATH, Johri Bazar.
2. BADRI, SON OF RAMNATH, Johri Bazar.
3. DHANALAL, SON OF SHOEBUKSH, Hawa Mahal.
4. DANODAR, SON OF GANGABUKSH, Hawa Mahal.



CHAPTER IV

THE ENVIRONS OF JAIPUR.

1. Amber.

IN a gorge of the hills called the Kāli Koh lies Amber, the ancient capital of the Kachhwāhā Rajputs. The Brahmans of the place say that it is named after Ambarisha or Ambarikha, as it is pronounced here, the son of Mandhātā, King of Ayodhyā. This is probably correct, and in process of time it has become shortened to its present form. The origin of the termination *er*, *ner* or *mer* found in so many place names in Rajputana has puzzled philologists, and puzzles them still.

It was the home of the Kachhwāhās for six centuries, being an ideally-strong place, and well suited for the condition of things in those far back years. By reason of its cramped situation it became unfit for being the capital of such a large and influential State as Jaipur had become, and so Siwai Jai Singh built Jaipur six miles off. The difficulties in finding accommodation seem to have taxed the ingenuity of the growing population, for the ruins of houses high up the brow of the hill are still to be seen. The wall round the town was pierced by three gates. First, the Maota Gate, partly demolished to allow the road from the Jaipur direction, which skirts the Maota lake, to be made. Second,

the Birāhī Gate, which opens on the Delhi road. Third, the Kherī Gate, which leads to the rugged hills covered with brushwood on that side of the town.

The expenditure on fortifications must have been enormous. Crowning the hills all round are walls of defence, many of them now crumbling to pieces, dotted at intervals with formidable bastions. Beyond the Bherī Gate is a double row of fortifications rising one behind the other, pierced by two gates, each having its guard. One interesting Fort far back on the crest of the hill, in the line of circumvallation to the north-west of the town, is deserving of attention, not only because of its position, but because there is a persistent tradition that this Fort, named Kuntalgarh, was a stronghold of the Minas before the Rajputs came to this part of the country. Kuntal, the fourth in descent from Dulhae Rao, may have added to it, and named it after himself; but to give colour to the probability of the tradition, there are the remains of a Maiwāsū, or Mina Settlement, below the Fort. The hills round about are the haunt of tiger.

The town itself is a mass of ruins. A few houses may be kept in repair by their owners, and the pious worshippers who visit Amber may have stayed the progress of decay in some of the temples; but the general impression left on the mind is a city in ruins. The Jaggat Siromani Temple is a very fine building in excellent condition, famous for its remarkable gate-way, and the beautifully-carved shrine opposite the temple entrance dedicated to Garurji, the vehicle of Vishnu. The temple of Anakeshwar not far off,

dedicated to Mahadeo, with a flight of steps leading down to the shrine, is also well worth seeing. But indeed to any one who has any love for the past, Amber is full of places and traditions which recall the deeds and personages of bygone days.

The Rajputs had a stiff struggle before they got possession of this famous place. The Rajputs being a superior race had the advantage; but on the other hand the Minas were doughty warriors, and above all they were fighting for their homes.

The Palace is the most interesting object in a scene of romantic beauty and peacefulness. It is built on a projecting part of the hill overlooking the Maota Lake. Towering above the Palace 500 ft. stand the Jaigarh Fort, out of which rises the quaint watch-tower called the Diwa Burj, from which the plain on the other side of the range of hills can be scanned. The Palace is massive rather than ornamental, but its solemn grandeur suits its surroundings well, and expresses the character of the people who built it. It was commenced by Man Singh about 1600 A.D. Additions were made by Jai Singh Mirza, and it was completed in the 18th century by Siwai Jai Singh. To this latter Prince belongs the honour of having built that peerless gate way which gives access to the Diwān-i-Khāss. One lingers over the lovely views which are to be got from different parts of the Palace, and both the Diwān-i-Amm and the Diwān-i-Khāss are admirable in construction and finish.

Minas always mount guard in this Palace. Perhaps a few words about these people may not be

uninteresting to the reader. In regard to occupation the Minas are divided into two classes, the agricultural Minas and the chaukedar Minas. Only the first, called here Barahgaon-ke-Mina, are employed as guards in the Palace and Forts. They are faithful and true. A Mina has been known to slay his son with his own hand for having been found unfaithful.

They claim to be of good descent, generally on the father's side; but whether the connection would be acknowledged legitimate by the orthodox Hindu is another thing. They are divided into a great many clans, each having its own clan Devi and Tolem, but they claim that all these clans have sprung from three great divisions *viz.*, the Purani Basi, the Nayi Basi, and the Padyār. Their marriage ceremonies do not differ much from the ceremonies of other Hindus. A Brahman is employed to fix the date of marriage and other important matters. Widows are allowed to re-marry. Bahru, Hanuman, and Krishna are worshipped as well as the clan Devis, and they join their hands before the clan Tolem, in all

Note —Amber lies to the north of Jaipur, about $7\frac{1}{2}$ miles from the Railway Station. The road is *via* the Sanganir gate, along the Johari Bazar to the Kund Manak Chouk, thence past the Sireh Deohri (where the Jaipur State Council have their offices) and out of the city by the Zorawar Gate. For the first $2\frac{1}{2}$ miles from this gate, as far as a small shrine known as the Kala Mahadeo, the road, which passes among many picturesque gardens and temples and not far from the Jal Mahal and Man Sagar, is open for ordinary carriages. For the remaining $1\frac{1}{2}$ mile, however, after it enters the hills by the (that (pass) Gate it is steep and rough in parts and a tonga is preferable. The ascent to the Palace itself is usually performed on elephants, but it is neither long nor particularly steep, and it is an easy walk.

cases a tree, and invoke a blessing. Those of the chaukedar Minas who belong to the light-fingered fraternity are intensely superstitious. Before going on their expeditions omens bad and good absolutely decide their movements. The braying of an ass on the left, the hooting of an owl on the left, and the cry of a jackal on the right indicate that their scheme of plunder will be successful. The cry of the sarus is unlucky, so is the meeting of a cat, sheep, or hyæna. According to last census there were over 240,000 Minas in the State of Jaipur.

2. Galta.

Galta is the name given to a beautiful and remarkable gorge in the hills to the eastward of the City of Jaipur. The gorge, which is some $4\frac{1}{2}$ miles distant from the Railway Station, is crowded from top to bottom with tanks and temples and places for the accommodation of devotees and pilgrims who gather here in considerable numbers.

The place as a holy resort dates from the time of a saint named Galava, who spent his life here some fifteen centuries ago, and whose shrine is one of the places of pilgrimage. The word Galta is perhaps a corruption of his name, or is derived either from "Galtan," a marshy place, or "Gallita," a narrow passage.

Passing through the City, and not far away from the easternmost gate, fittingly termed the Suraj Pol or Sun Portal, the road ends in a gateway at the foot

of the range of hills. Here begins a road paved with rough stones, which goes in a zig-zag up the range, flanked on the ravine side by a low wall. After a bend or two is a monastery quaintly coloured in red, half-way up the ascent is a rooiny pavilion, and at the top are two Rest-houses or Banglas. In an alcove hard by is an inscription in Hindi, recording the amount spent in making the road, and another describes how the road and the pavilions were constructed by Shamlal Kaye-th and his brother, Sunderlal, of the Jaipur State Service, to whose religious munificence various *ghats* and temples at Pushkar and Hardwar are also attributable.

The crest of the ridge is about 350 ft. above the plain, and near the top on a projecting rocky platform stands the famous temple dedicated to the Sun. This was built by Rao Kirparam in the reign of Maharaja Sawai Jai Singh II, and it is curious that Rao Kirparam, who was a Jain, should have built a temple to the Sun. It is a fact however, that this Jain, representative of the Chiefs of Dhurdhar at the Imperial Court at Delhi, was a sincere devotee of the sun, and he created no less than seven temples in honour of his god. His descendants in Jaipur are the hereditary worshippers at this temple to the present day. There is nothing remarkable about the temple as a building, but the view obtained from it of the City nestling just at the foot of the hills, with its minarets, palaces and gardens brought into relief by its setting of yellow sand, is superb and fascinating in the extreme.

It is from here that the Image of the Sun is

carried in royal state through the City in a chariot drawn by white horses once a year, at the time of the vernal equinox. His Highness the Maharaja with his Sirdars and officials, and with every accompaniment of Eastern pomp and splendour, himself joins the procession, and the whole ceremony is one of the most brilliant of the many fine scenes to be witnessed in Jaipur.

From the ridge, the road descends rapidly towards the Galta, passing in its course through wild and rocky cliffs, the abode of large troops of monkeys of both the grey and brown varieties. These hills are connected with a State game preserve further east, and the presence of tigers and panthers in the neighbourhood is by no means unusual.

At the foot of the first incline is a tank on the right called *Kadamba Kund*, while to the left there is another known by the name of *Yagya Kund*, or sacrificial tank, crowned by an old temple where the saint *Galava* attained salvation by lifelong penance. Passing through a narrow doorway into the gorge itself, where the rocks are hardly 50 ft. apart, one obtains a full view of the scene in all its weird and romantic beauty. Enclosed on either hand by precipitous cliffs the gorge drops rapidly down till it is merged in the open plain some two miles away. From the very top a fine spring which never fails even in the driest season gushes forth from the ever-sacred *Gaimukh*, and feeds a succession of tanks for the use of the bathers, while picturesque temples and other buildings meet and delight the eye all down the descent. Attention is drawn to the painted

ceilings of some of the pavilions and towers near the fourth tank.

The two principal temples are dedicated to Ramchandraji. This deity and his hereditary priest are highly venerated by the *Ramunuja* sect of *Vaishnava* Hindus.

Crowning the cliff on the left is an old fort called Raghunathgarh, while on the right side there is a cave in which the Saint *Payahariji* lived. He was the religious preceptor of Nabhajee, the well-known saint and writer of the *Bhaktamala*, who lived only on milk, and who is credited with many miracles, including the taming of tigers.

3. Ghat.

Ghat (pass) is the name given to the passage that leads through the hills to the south-east, along the main road to Agra. The approach is past the Ram Newas Gardens, the Ajmer and Sanganir Gates and the Central Jail. The length of the pass is about a mile, and it is enclosed on either side by high cliffs, on the northernmost of which stands the Ambagarh Fort, which forms part of the outer line of circumvallation that connects Jaipur with Amber. The road through the pass is most picturesque, being lined on either side by a continuous string of temples, gardens and country houses, belonging some to the Darbar and others to nobles and trade guilds of the City. The place is a great resort for pleasure parties from Jaipur. The large Darbar Garden near the

farther end of the pass is the place best kept up and the best worth seeing. One of the gates of this garden is called the Machli Darwaza (Fish-Gate). It leads to some old temples with fresco paintings on the wall, which may be found of interest.

The oldest buildings in Ghat must date from the first occupation of Amber itself, as the pass eastwards is an easy one, a further attraction being the excellent supply of spring-water that flows from the neighbouring hills. Some three miles distant on the south-east side of the hills is the ancient village of Kho, which was a Mina stronghold before the advent of the Kachhwaha Rajputs in the country. An attractive legend told in Tod's Rajasthan connects this place with the arrival of Dulhae Rae, the first Kachhwaha Chief to establish himself in Rajputana. Deprived of his succession to Narwar, his mother fled with him as a child and found refuge at Kho. The high destiny awaiting him was revealed to the people on their finding a *cobra* rearing his head over the child as he slept. A large serpent carved in rock, which is to be seen at Kho, is to this day an object of veneration among the people.

4. The Maharajas' Chattris.

The cenotaphs of the deceased rulers of Jaipur lie clustered near the village of Gailor to the north-east of the City, and under the shadow of the towering fortress of Nahargarh. The road is through an old suburb called Brahmpuri which is situated just out-

side the City wall, and which is said to have been formerly inhabited only by the Brahmans. The cenotaphs are in a neat enclosure in well-planted gardens, the trees of which are full of solemn-looking monkeys.

The first Chattri seen on entering the walled space within which the tombs are grouped is that of Maharaja Sawai Jai Singh (1699-1743 A.D.). It is the finest of the lot, being constructed of the purest white marble from the quarries at Rainwalla, and adorned by rich and exquisite carving. In a niche under the upper platform of the Chattri there is a lamp which has been kept burning continuously since Sawai Jai Singh's death. A model of this tomb is to be seen in the South Kensington Museum.

Another of the Chattris worth notice is that of the late ruler, Maharaja Ram Singh (1835-1880). It is built just to the north of Sawai Jai Singh's Chattri, and is an exact reproduction of the latter in style and ornamentation.

The remaining Chattris require no separate mention.

5. The Water Works.

The Jaipur Water Works lie $1\frac{1}{2}$ miles to the north-west of the Railway Station. A series of wells sunk in the bed of the Amani Shah river and connected by tunnels effectually tap the waters of the stream, and provide Jaipur with a constant supply of good water throughout the year. The whole scheme

is a triumph of engineering skill, and the works are well worth a visit.

A further notice of the subject will be found at page 69, Chapter V, The State Public Works Department.

6. The Imperial Service Transport Corps.

The Jaipur Imperial Service Transport Corps was raised by His Highness the Maharaja in 1889, with 1,000 ponies, 500 men and 400 carts.

The present strength is 1,172 ponies, 16 tongas, 544 carts and 775 men.

In command of the Corps is a Superintendent (Rai Bahadur Dhanpat Rai, C.I.E., Sirdar Bahadur), who has under him an Assistant Superintendent and eight Troop Officers.

The Corps took part in the Chitral Expedition in 1895-96, and in the Tihah Expedition in 1897-98, when the excellent services it rendered were highly appreciated by the Military authorities and the Government of India.

The expenditure on the Corps for the past year was Rs. 2,54,260.

The Corps has ambulance arrangements in accordance with the regulations of the St. John's Ambulance Association, and can remove at once 700 sick or wounded men: it makes in its own workshops all its own carts, saddlery and other gear. In fact it is most admirably organised, and it is a complete self-contained unit ready to proceed anywhere at a moment's notice.

The Jaipur State, too, obtains most useful work from the Corps in time of peace, for the carts are continually employed on a hundred and one duties all over the Capital. Among other services rendered, the Superintendent and his men took entire charge of the Jaipur Famine operations during the famines in 1900 and 1906. On the first occasion it had charge of some 25,000 people and on the latter 9,000, and there is no doubt that a great many lives were saved owing to the prompt and efficient aid the Corps was able to give.

The Lines of the Corps are about a mile to the north-west of the Railway Station.

7. The Naya Ghat Gardens.

Beyond the Transport Corps Lines and about two miles north-east of the Railway Station, there are some very beautiful gardens lying in the bed of the Aman-e-Shah river. The locality is known as the Naya Ghat.

The gardens, which are some two miles long, were laid out in 1896 by Sardar Bahadur Dhanpat Rai, C.I.E., the Superintendent of the Transport Corps, partly with the aid of the men of the Corps and partly by employing famine labour. What was before a reed-grown pestilential swamp has been converted into one of the pleasantest spots in all Jaipur. The people of the City come here freely, while during certain festivals as many as 20,000 sometimes assemble in the gardens.

All sorts of fruit and vegetables are grown in the gardens, as also various sorts of grain and fodder for the feeding of the Transport ponies. The yearly income derived at present is R. 8,000.

8. The Rawalji's Bund.

This *bund* and the fine stretch of water it holds up are situated about a mile and a half to the south-west of the Railway Station along the Khatipura road.

The *bund*, which was constructed in 1845, lies across the Aman-e-Shah stream, which higher up furnishes the water for the Jaipur Water Works. It was formerly known as the Sodhawala Bund as the site belonged to the village of that name. In 1845 the village was granted by the Darbar to the then Rawalji of Samod, Sheo Shinghji, and the *bund* has since been known by its present name.

The lake formed by the *bund* is a fine place of water a mile or more long by a width varying from 50 to 200 yards. There are several boats, and the lake is well stocked with fish, *murrel* and *rohu* for the most part. An hour or two spent here is an agreeable way of passing a summer's evening. Fishing however is prohibited, and the use of the boats cannot be obtained except by special permission.

9. Sanganer.

Sanganer, seven miles to the south of Jaipur City,

may be reached either by rail or by a pleasant drive over a good road. On the left soon after leaving Jaipur is to be seen the Moti Dungri (Pearl Hill) with a fort and temple on the top. As the Railway Station at Sanganer is nearly three miles from the town, the visit is best made all the way by road.

The town is an old one and is surrounded by a high wall, access being gained by a number of strong gateways.

The chief buildings of interest are a large inner gateway, the old palace, the famous Jain temple which dates from the 11th century and is one of the most beautiful and best preserved temples in the East; the temple of Sangababa an ancestor of the Jaipur Chiefs who flourished some eighteen generations back, and a Dadupanthi monastery where the great Dadu, the founder of the Dadupanthi sect of which the Nagas in Jaipur are the principal representatives, is said to have lived.

Sanganer is famous for its chintzes and muslins, these being stamped in a variety of pretty designs.

10. The Residency.

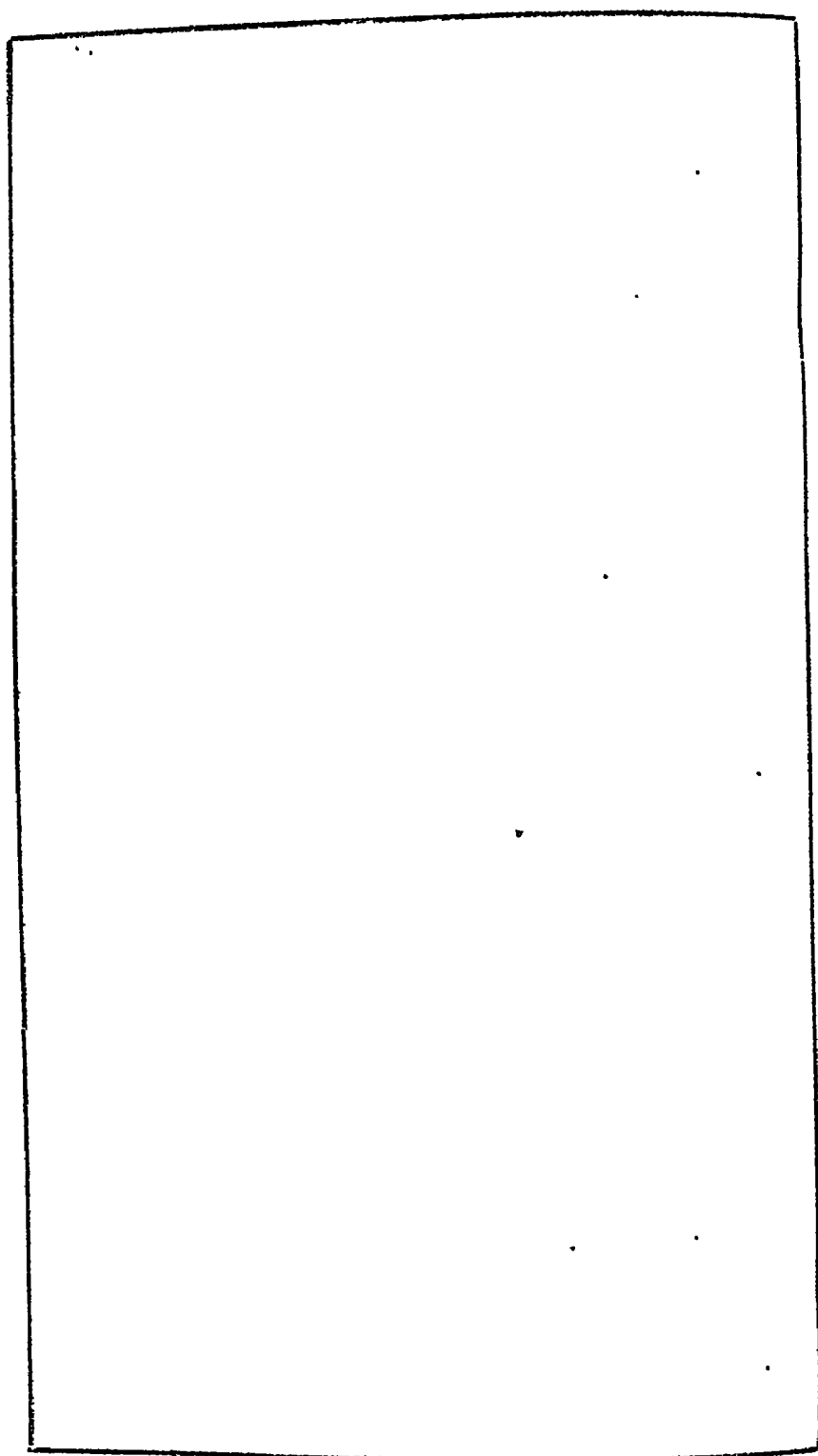
This beautiful and palatial building is the official residence provided by the Jaipur Darbar for the use of the British Resident. It lies one mile to the south-east of the Railway Station. The oldest part of the building was constructed some one hundred and eighty years ago by Maji Shree Ranawatji Sahiba, wife of the renowned Maharaja Sawai Jai Singh II,

the founder of Jaipur and daughter of Maharana Amarsingh of Udaipur. Hence the house and the surrounding gardens are known as the 'Maji-ka-bagh.' Madhosingji, who eventually succeeded to the Chiefship, was the son of Maharaja Jai Singh II, by this Princess, and it is said that it is here he was born (A.D. 1731), and soon after removed from here to Udaipur by Maharana Amarsingh, his maternal uncle, for fear of his being murdered by his elder half-brother Maharaja Isarsingji.

Captain J. Stewart was the first Political Officer to live in the Maji-ka-bagh. This was in 1821 A.D.

The original building forms the southern line of the present group and faces the Sahan Chabutra and the gate. This gate and the high masonry wall surrounding the inner garden also formed part of the original abode of the Maji. The gateway is of great beauty being a copy of the famous gateway of Amber. The rooms forming the east wing and the billiard-room have been added subsequently at different times.

During the siege of Jaipur by Amir Khan and his Pindari freebooters (A.D. 1817) the Maji-ka-Bagh formed the left of the enemy's line, his right touching the hills to the eastward, while the Moti Dungri formed the centre.



CHAPTER V.

THE STATE PUBLIC WORKS DEPARTMENT.

THIS was started about 1860, under Colonel G. U. Price, of the Bombay Army. Since 1867 up to the year 1902, it has been under Colonel now Sir Swinton Jacob, K.C.I.E., whose services were lent by the Government of India. From 1873-78 he was assisted by the late Mr. T. W. Miles, and since 1896 by Mr. C. E. Stotherd, A.M.I.C.E.

Since 1902 Mr. Stotherd has been in sole charge as Superintending Engineer.

These Officers have been well assisted by the following Assistant Engineers, who have all done good work: Pundit Ghasi Ram (deceased), Lala Rup Chand, Babu K. N. Mukarji and Lala Indra Sahai.

The following is a statement of expenditure from 1868 up to 31st August 1908.

		Rs.	A.	P.
Original Works ...	...	35,74,617	3	4
Repairs ...	...	36,08,171	11	3
Miscellaneous Public Im-				
provements ...	...	71,29,092	8	0
Irrigation ...	...	74,72,288	14	10
Establishment ...	...	15,27,151	5	11
Work for other States ...	...	6,46,824	11	11
	Total ...	2,39,58,146	7	3
Gas Works ...	...	12,59,034	11	5
Imarut ...	...	27,52,830	12	8
	GRAND TOTAL ...	2,79,70,011	15	4

Roads.—There are about 287 miles of metalled roads in the State, *viz.*, the Agra and Ajmer Road runs east and west through the State about 133 miles in length; the Jaipur and Tonk Road about 47½ miles, and the road from Hindaun Road Station on the R.-M. Railway to Kerauli about 43 miles.

The metalled roads in the City and vicinity aggregate about 47 miles.

There are about 232 miles of unmetalled road in the State.

Irrigation.—The number of Irrigation Works in the State under the management of the Public Works Department is 213 :—

Completed	...	...	...	208
Works in progress	...	...	...	5

The main distributaries vary in width from 5 to 20 ft.

The amount of water considered sufficient to irrigate one acre is 100,000 c.ft., which allows for wastage.

There are no perennial streams; every effort therefore has been made to bund up every drop of water, that falls in the rains, wherever it is possible to do so.

The total capital cost of all the works executed amounts to Rs. 65,09,591 and the total amount which it is estimated has been realised is Rs. 75,78,839-1-3 up to 31st August 1908.

The return on the outlay taken from the returns for the last year is Rs. 6,87,458, which gives an average of about 10 per cent.

It is the policy of the Durbar to add to their Irrigation Works year by year, and fresh surveys and projects are continually being drawn up. The benefits derived from these works are incalculable, and have been exemplified in the recent years of deficient rainfall.

These village tanks store up sudden and heavy falls of rain, which would otherwise run to waste and be lost to the State; they raise the level of saturation of the sub-soil in their vicinity, thus benefitting all neighbouring wells; and help to prevent the population from leaving the country in times of scarcity.

The larger Tanks have enough water to last over two years, and in the smaller tanks, when empty, the beds can be cultivated and produce good crops.

A large number of new Irrigation Works were taken in hand during the famine of 1899 to 1900. Rs. 5,31,015 were spent on these alone.

The average rainfall is about 25 inches. In 1908 it was only 22.13. Deficient rainfall naturally militates against good returns from the Tanks; yet the average *net* profit during a long period of more or less drought has been about 4 per cent.; and the indirect benefit to the cultivators incalculable. In normal years the profits amount to 6 or 7 per cent. and in some cases much more.

There are instances on record when the largest works have been filled by a single day's rainfall. This occurred at Boochara in 1893, and at Chaparwara in 1898.

In the former case sufficient water was accumu-

lated in a single day to irrigate about 11,000 acres or approximately 17 square miles. In the latter case, the capacity of the Tank being 1,241 millions c.ft. sufficient to irrigate about 10,000 acres or 15 square miles, was impounded in a single day, which was also the only fall of rain of importance in that district during that year.

The statement attached shews the initial cost of a few only of the works done, the average annual revenue realised and the total revenue realised.

Statement showing Initial Cost and Revenue realised from the following.

NAME.	Comple- ted.	Initial Cost.	Up to Date.		Average Annual Revenue.
			Total Ex- penditure.	Total Realised.	
1. Fatch Sagar Tank ...	1876	2,375	17,467	1,85,992	5,812
2. Khir Dam. .	1877	76,284	1,19,298	1,72,269	5,557
3. Mora Sagar	1878	81,817	1,86,699	9,33,123	31,104
4. K a l e g h Sagar ...	1883	2,07,414	3,06,687	7,31,719	29,268
5. Tori Sagar	1887	5,08,655	6,43,630	8,32,817	39,655
6. Boochara .	1889	2,79,368	3,49,992	1,31,603	22,715
7. Bund Benouri and Lewali supply cut	1878, 1895 & 1897	78,198	1,79,821	3,22,327	10,072
8. Chaparwara	1895	4,33,025	6,05,825	2,70,154	20,781
9. Sainthal Sagar ...	1898	1,35,025	2,13,303	1,46,451	11,615
10. Ramgarh (Crosthwaite Sagar) ...	1902	5,51,484	5,63,217	3,81,414	64,069
11. Mozabad Naya Sagar.	1872	14,364	18,297	1,19,131	3,309

The Water Works.—About 70 years ago a masonry dam 60 ft. high was built in the Aman-e-Shah Nulla, about $1\frac{1}{2}$ miles west of the city, to supply the town with water. The mistake was to put a masonry dam in such soil; it would have answered no doubt well enough if the bed and sides had been in rock, but in this loose sandy soil when the reservoir was nearly full the water got round the west abutment, and the dam was breached.

The late Maharaja Sewai Ram Singh who witnessed the catastrophe, described it as "the grandest and most expensive *lamasha* he had ever seen."

In 1867 when Lieutenant Jacob came here as Executive Engineer, the town depended for its drinking water upon wells in the city and in the suburbs. The water in nearly all the wells in the city was more or less brackish. Owing to the position of Jaipur, no natural supply appeared possible, so it was decided to raise the water by steam pumps, to a reservoir on high ground, and let it gravitate to the city.

As soon as the feasibility of the scheme was proved to the satisfaction of the Durbar, sanction was readily given to carrying out the complete project. It was a free gift to the city by H. H. the late Maharaja Sewai Ram Singh. The water is pumped up to a height of 110 ft. into two service reservoirs which have been built on the natural high ground; each reservoir is 150' \times 100' and 15 ft. deep. The reservoirs are covered over; iron barred openings are left at the top and at the ends for ventilation.

The water from one reservoir is allowed to flow

through a 12" iron pipe to the city, while water is being pumped into the other. The bottom of the reservoirs is 50 ft. above the level of the main street, branch pipes are laid in all the principal streets and stand posts are erected at every street corner.

The supply is constant day and night. Only those persons who have water laid on to their houses pay any water-rate, which is charged monthly, one rupee for the first tap and eight annas for every other tap. No water-rate is levied on the City.

The water was first supplied in 1874.

After some years the supply of water, in the stream during the hot seasons, ran very short; a well was then sunk in the bed of the river with the hope of tapping the supply below ground; and the water was raised by a deep well pump, but the yield was not sufficient.

An earthen dam was then built across the nullah above the pumping station: the length is 800 ft., the top width 30 ft. and the width at the bottom 400 ft., the height is 61 ft. It forms a solid horizontal roadway across the Nullah. It was begun in July 1884, and completed in 1885, and stops every drop of water that comes from a drainage area of 13 square miles.

In February 1902, the reservoir dried up, but one-quarter to one-third of the normal supply of water to the city was still supplied, by a supplementary dam of earth, below the main dam, to catch any leakage from it, and aided by two large wells 20 and 25 feet diameter which had been sunk

in the bed of the reservoir, and were connected by a gallery with each other and with the outlet sluice; but even this was not sufficient.

In 1896 the rains partially failed, and the rainfall of succeeding years being deficient, the bores of the public taps were reduced to prevent waste.

In 1899 the rains totally failed, and though the rainfall of 1900 was heavy, the floods brought down so much silt that the bed silted up 15 ft.

In 1902 the reservoir which for sixteen years had never failed, dried up altogether; and 20 ft. of silt had accumulated over the original Nullah bed.

In 1905 the monsoon failed, no water came into the reservoir, and it was necessary to take energetic measures to supply the city.

Mr. Stotherd, who was then Superintending Engineer, decided to sink the two existing wells in the reservoir much deeper, to between 50 and 60 ft. below the present bed, and to sink eight more wells each of 20 ft. internal diameter and 80 ft. apart to the same level or deeper if necessary. The whole chain of ten wells is connected by a circular masonry culvert of 5 ft. 9 inches internal diameter, through which an 18-inch cast-iron suction main, reducing to 16 inches, is laid, with branches down into each well. From this main the existing pumps are able to draw on the whole series at once, whether the reservoir is empty or whether it is full. The water is always clear and practically filtered. Each well is provided with a hand-rail and steps inside and out, and the mouth is covered over to prevent contamination and keep the water free from

any vegetable growth. All the wells have been banked with earth outside. The connecting gallery is 524 ft. long, the pipe is laid on ashlar blocks so as to leave the joints clear and enable the pipe to be packed up in case of need. The arching is keyed with ashlar in which rings are fixed to enable any pipe to be lifted at any time.

The suction main runs in a continuous slope of about $\frac{1}{2}$ -inch per 100 ft. *downwards* from the pumps to enable any leakage into the main from any cause to be drawn off without the possibility of an air lock forming in the main, and stopping the flow of water.

An air vessel was placed on the highest point of the main, and a small continuous ejector has been fitted to the top of it, which works automatically day and night.

The total length of the suction main is about 1,700 ft.

This work was completed by February 1908, and until the monsoon of 1908, the city was entirely dependent on the supply from these wells. The daily consumption of water was 6,96,000 gallons, and taking the population to be 160,000, comes to about 4·3 gallons a head. The water is raised at a cost of about 2·3 annas or less per 1,000 gallons.

Jaipur Sewai-Madhopur Railway.—This is a Metro-Gauge line 73 miles long made by the Jaipur Durbar, branching off from the Sanganer Station of the R.-M. Railway to Sewai-Madhopur, the south-east corner of the State, where it joins the Nagda-Muttra

Broad-Gauge line made by the B. B. and C. I. Railway Company. It was surveyed and carried out from the beginning to completion by Mr. Stotherd, assisted by one Assistant Engineer, Mr. Mukerji.

It runs through the centre of the southern portion of the Jaipur State, passing important places, *viz.*, Sanganer, Sheodaspura, Chatsu, Newai, Isarda, and Chouth-ka-Barwara. There are fourteen large and fifty-six small bridges.

The principal work on this railway is a bridge at the fifty-second mile, over the River Banas, where at this point in its course it drains an area of about 14,000 square miles. The bridge consists of thirty spans of sixty-foot girders. It is 1,974 ft. long from face to face of abutments, and 65 ft. in height above the bed of the river at its deepest point. It is founded on rock.

The River Banas is nowhere bridged in this State, it is only fordable at certain points in the dry season, and is impassible during floods in the rains, except in large flat-bottomed boats. The bridge therefore should prove very useful in providing communication across this large river; a footway is provided.

The line was inspected by the Government Inspector of Railways, and was opened for traffic on October 11th, 1907.

The most important buildings which have been carried out by the P. W. D. are:—

The Albert Hall.—At the request of the late Maharaja Sewai Ram Singh, the King-Emperor when

he visited India as Prince of Wales on the 6th February 1876, laid the Foundation Stone of this building.

The object was to have a permanent memorial of the visit of his illustrious guest, to provide a suitable place for a Museum, and to have a place in the Public Gardens where visitors at any time can take shelter or rest.

It was formally opened by Sir Edward Bradford, who was then A. G.-G., in February 1887.

Local marbles, and marble from Ajmer and Mekrana have been used in the decorative portions and in the floors.

The endeavour has been also to make the walls themselves a Museum, by taking advantage of many of the beautiful designs in old buildings near Delhi and Agra and elsewhere. In some cases these designs have been followed: or have inspired the workmen here.

The total cost of the building was Rs. 5,10,036.

The Mayo Hospital.—This was built by H. H. the late Maharaja Sewai Ram Singh to commemorate the visit of Lord Mayo, the first Viceroy who came to Jaipur. He laid the foundation stone, at the request of the Maharaja, on the 14th October 1870.

The design and working drawings were prepared by Surgeon-Major DeFabeck, I.M.S., at that time Principal of the School of Art here, but alterations and additions have been made from time to time.

It was opened by Lord Northbrook in 1875, who at the same time unveiled the statue of his

predecessor which stands in the Public Gardens close by.

Including detached wards there is accommodation for about 160 in-patients.

Gas and water are laid on. There are bath-rooms, store-rooms, special wards; and a special operation room, separate from the main building, and a chamber for disinfecting clothes and bedding. A good dispensary and waiting place for out-patients is also provided.

Cotton Presses.—Applications having been made by outsiders for permission to erect Hydraulic Cotton Presses at Jaipur, the Durbar considered it better for many reasons to erect State presses and to keep the matter in their own hands.

Two of Nasmyth Wilson & Co.'s Steam Compound Hydraulic Baling and Finishing Presses were erected near the Railway Station at Jaipur in 1891, and at Hindaun Road soon after; and when the cotton crop is good, these Presses give good returns.

Stone and Marble Work.—Owing to the good white and coloured marbles obtainable here and to the skilled workmen in Jaipur, much excellent work has been done in marble and stone of late years here. Altars, Arcades, Reredoses, Fonts, Pulpits, Lecterns, Tombstones, etc., have been designed—made and sent to many parts of India.

Gas Works.—These were erected by order of H. H. the late Maharaja Ram Singh, who gave the contract to a Mr. Silbiger in 1878

The gas is made from crude kerosino-oil. The net cost of maintenance is about Rs. 34,000 per annum. The cost of making the gas is about Rs. 7-14-0 per 1,000 c. ft.

The average number of jets lit daily is about 778.

The streets, the Palace, the Church, the Residency and some of the public, and a few private houses, are lit with gas. The revenue realised in 1908 was Rs. 4,099.

Ram Newas Public Gardens.—These Gardens were begun in 1868 by the order of H. H. the late Maharaja Sewai Ram Singh to provide employment for the poor of the city during the famine of that year.

His object in choosing this site, was to have the Gardens close to the City gates, so that even the poorest might be able to take advantage of them.

The Gardens were originally designed by Surgeon-Major DeFabeck, I.M.S., who was for some time Principal of the Jaipur School of Art.

One section is set apart for wild animals. The aviaries for birds who feed on grain, and for the meat-feeding birds, are separate. The arrangement made for the happiness and comfort of the birds is a pleasant feature.

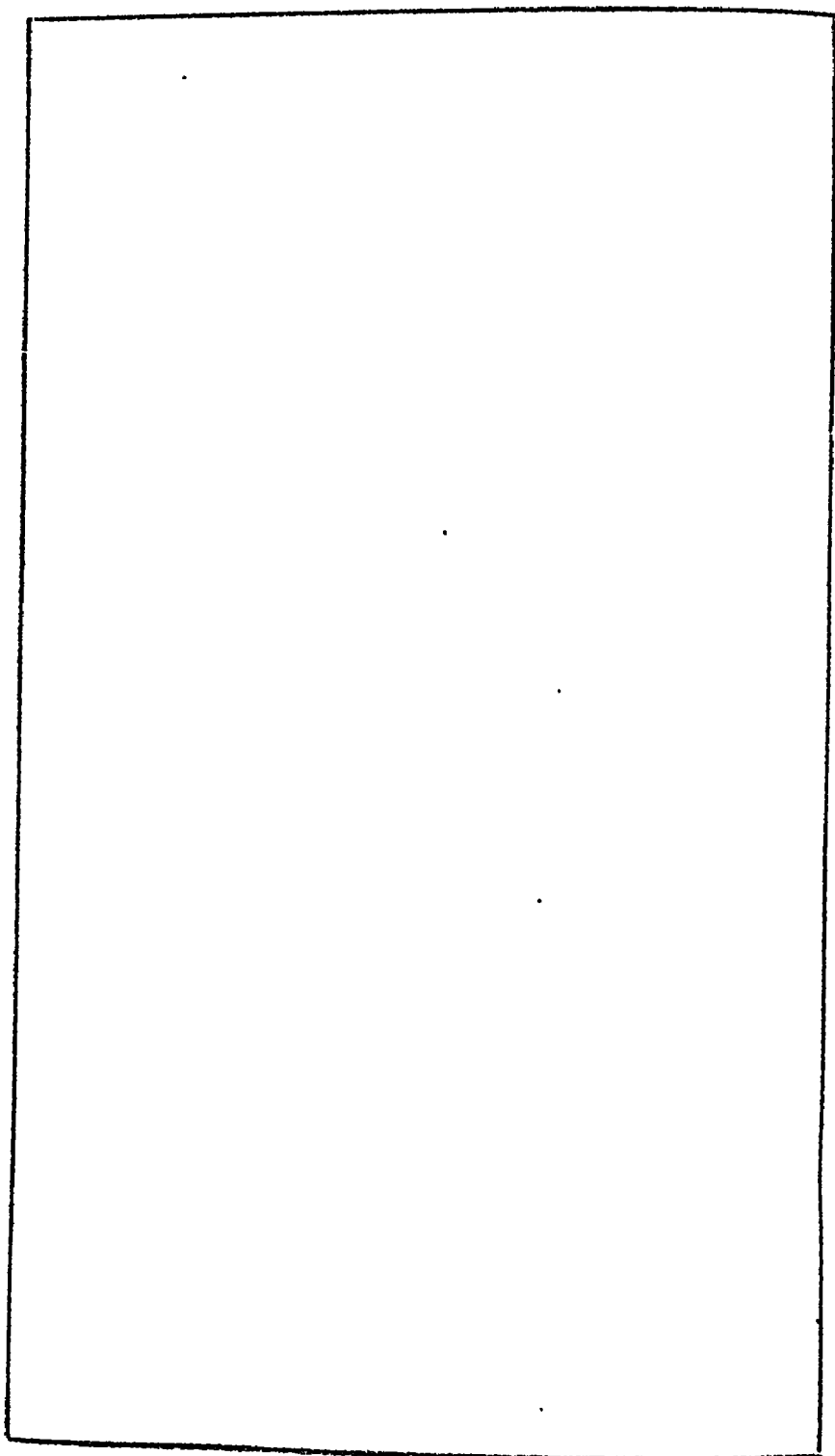
The cost of maintenance is about Rs. 14,000 per annum for the Garden, and about Rs. 12,000 for the Zoological Section. This money is all however spent in the State, and affords employment and amusement to many.

The sons of malis are taken as apprentices and are taught gardening work ; also reading, writing and arithmetic in the Vernacular ; and are periodically examined by the supervisor.

The Maharaja's Band plays in the Gardens one evening of the week. Seats are liberally provided all over the Gardens.

There is an open-air Gymnasium, a Cricket ground, and a place for Football ; but there is not enough space to meet all the demands.

The Gardens are popular, and it is a pleasing sight of an evening to see the numbers who frequent them, and shew how well they appreciate all that has been done for their pleasure and amusement.



CHAPTER VI.

THE STATE MEDICAL DEPARTMENT.

THE Jaipur Medical Department under a succession of able directors, ending with Colonel P. Durrell Pank, the present Residency Surgeon, has attained a high degree of usefulness and success, and the State is as proud of its medical institutions as the people are appreciative of the benefits conferred on them by the Darbar who maintain them.

In all there are 22 medical institutions maintained by the State, viz., the Mayo Hospital, the Lansdowne Hospital, three branch Dispensaries, two Jail Dispensaries and a Lunatic Asylum in Jaipur itself, and 14 dispensaries in the District. Eight of the latter have been opened since the accession of the present Maharaja. There are also seven dispensaries maintained by nobles in their respective Estates.

In all the Hospitals and Dispensaries of the State 4,329 in-patients and 2,54,958 out-patients, or a total of 2,59,287, were treated during 1908. The total of 1898 was 1,81,533. This striking increase not only speaks for the liberality of the Durbar, but reflects the highest credit on the management. The number of major and minor operations performed during 1908 was 1,284 and 8,995 respectively.

The Mayo Hospital.—The central and head-quarter institution is the Mayo Hospital which, for

the magnificence of its building, the perfection of its arrangements and the extensive nature of the work done can have few rivals in Upper India.

The foundation stone of the Hospital was laid in 1870 by Lord Mayo. It was opened in 1875 by Lord Northbrook, who also unveiled at the same time the statue of his predecessor, which stands in the Ram Newas Gardens close by.

Including the detached wards, there is accommodation for 160 in-patients. During the year 1908, 2,434 in-patients and 26,728 out-patients, or a total of 29,162, were treated. The average daily attendance of sick amounted to 375.63, and 569 major and 1,107 minor operations were performed. Among the major operations were 236 cataract operations and 38 stone.

The attendance of women and children is very large, being 41.79 per cent. of the whole. In all the institutions the average is 43.84 per cent.

The Hospital has been provided with electric light, and an X-Rays apparatus is now in operation.

There is a class of 13 untrained dayis* who receive instruction in midwifery. Lectures are given for two years, after which the batch is discharged and a new one is admitted.

The Hospital building was designed by Dr. de Fabeck, and has been considerably extended in all directions. Gas and water are laid on, and there are excellent bathrooms, stores, special wards, a special

* Native midwife.

operation room separate from the main building, a chemical laboratory and a chamber for disinfecting clothes and bedding. The surgical ward and the operation room are paved with marble. The treatment given is entirely free, and the in-patients are dieted at the expense of the State.

In the Lunatic Asylum there are at present 55 male and 21 female inmates.

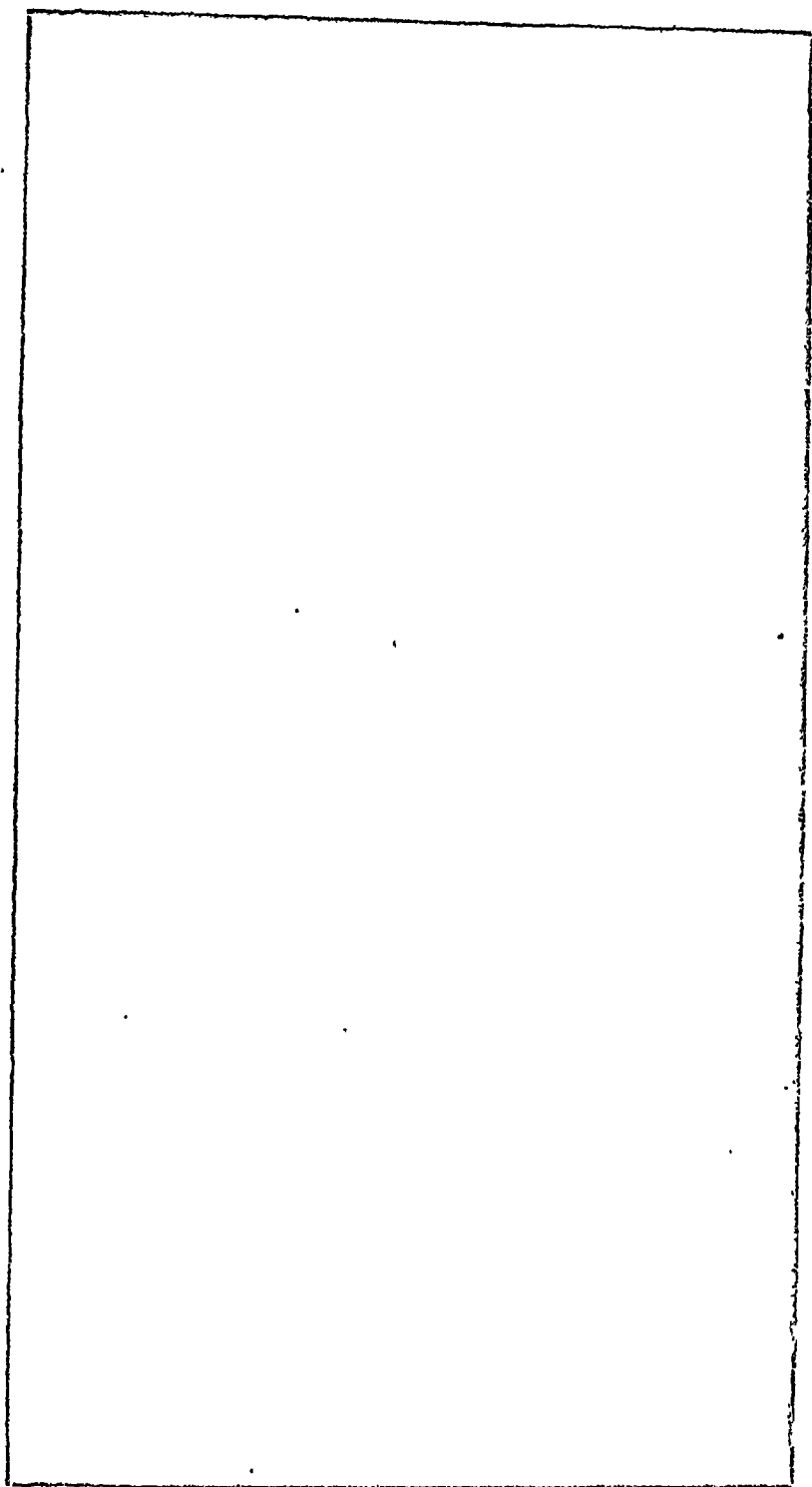
Vaccination.—Upwards of 81,258 children were vaccinated in 1908 by 42 operators, an increase of 22,796 vaccinations since 1898.

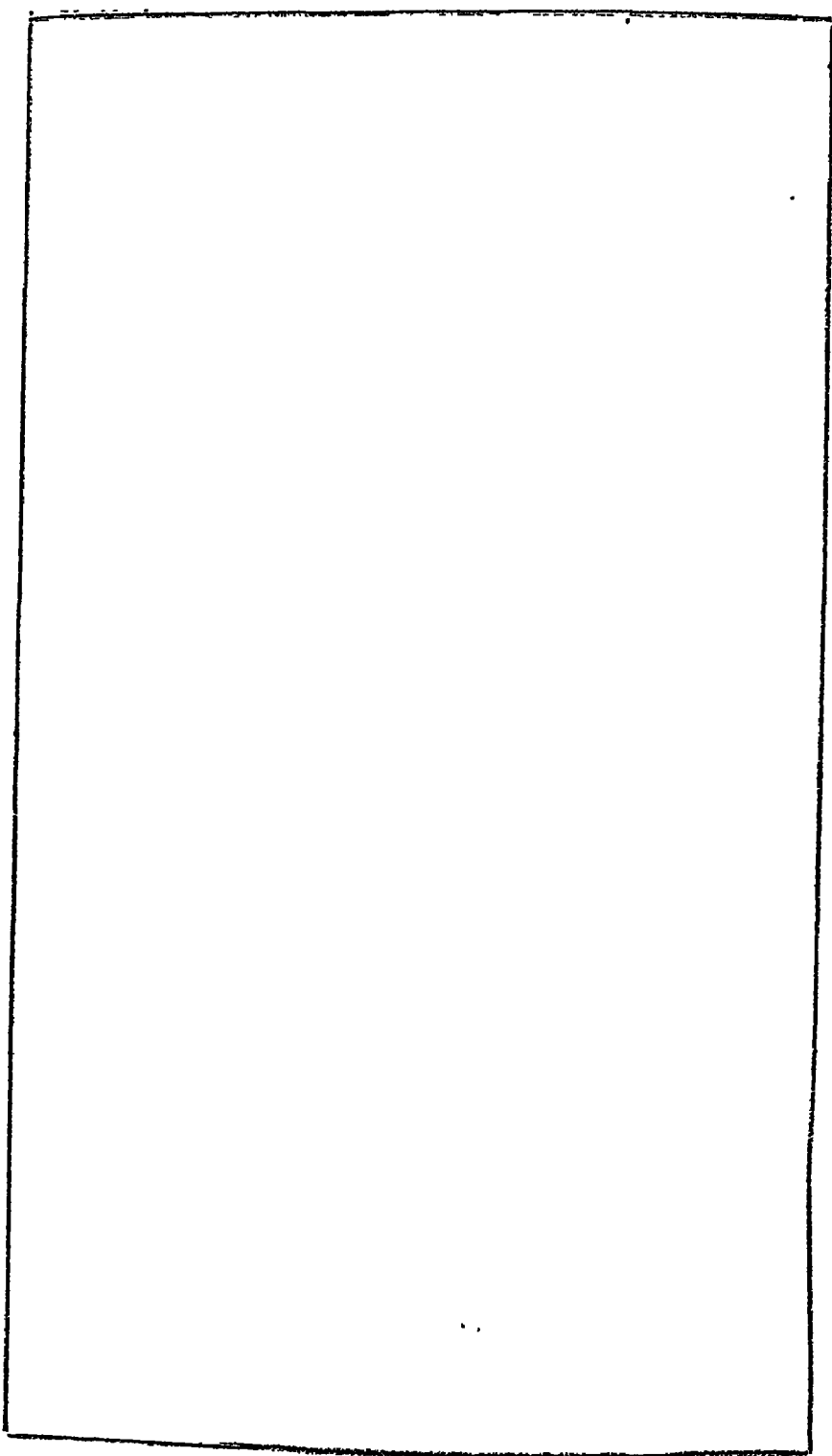
Exclusive of the expenditure in the seven dispensaries maintained by nobles, the average annual cost of the Medical Department for the past ten years was Rs. 87,255.

The institutions are under the supervision of Lt.-Colonel P. Durrell Pank, I.M.S., who is assisted by a staff of four graduates of the Calcutta and Lahore Medical Colleges, 31 Hospital Assistants, one qualified Female Assistant Surgeon and one qualified Female Hospital Assistant.

Lansdowne Hospital.—In 1891 a large hospital called the Lansdowne Hospital was built, with accommodation for 25 in-patients. This Hospital is intended to serve as a Regimental Hospital for the Imperial Service Transport Corps, for the Escort of His Highness the Maharaja, and as a General Hospital and Dispensary for the numerous work-people employed in the Cotton Press, the Water-works and adjacent establishments, &c.

Sanitary Department.—In 1895 a Sanitary Department was instituted, with two inspectors and an office staff, and working in connection with it there is a Bacteriological Laboratory at the Mayo Hospital.





CHAPTER VII.

EDUCATION IN THE JAIPUR STATE.

THE total number of schools of all sorts in the State, during the year ending 31st August 1909, was 1,135, with 31,524 scholars, as against 456 schools and 14,296 scholars in 1901-1902, a remarkable increase.

There were two Colleges—the Maharaja's College with nine Professors and 103 students, and the Sanskrit College with eleven Professors and 124 students. Detailed accounts of these will be given further on.

The total number of Secondary schools was 36 with 4,279 scholars on the rolls. Ten of the schools were Anglo-Vernacular and 26 Vernacular Schools.

The Primary Schools for boys numbered 143 with 6,353 scholars, and those for girls twenty with 1,246 pupils.

There were also five Technical and Industrial Schools with 432 scholars; and the number of Indigenous schools was 936 with 18,939 pupils.

The percentage of scholars to the schoolage population, taking the latter at 15 per cent. of the total population, was 14·36 for boys, ·66 for girls and 7·9 for boys and girls taken together, while the figures for 1901-1902 were only 7·13 for boys, ·38 for girls and 3·8 for boys and girls together.

Of the total number of pupils, 78·5 per cent. were Hindus. The rest were Mahomedans, Jains and Christians in the proportion of 11·23, 9·57, and 1·00 per cent., respectively.

The total State expenditure on education during the year mentioned was Rs. 83,403, details of which are given below :—

	Rs.
Maharaja's College	26,570
Maharaja's Collegiate School ...	9,536
Sanskrit College	6,557
Sanskrit Collegiate School ...	1,900
Chandpol School	3,073
Girls' Schools	6,184
Rajput School	2,252
District Schools	13,841
Inspection	2,656
School of Arts	8,064
Aid to Jain Schools	600
Rozindari and other Funds ...	2,170
Total	<u>83,403</u>

The following Colleges and Schools which are located in Jaipur City require separate notice.

The Maharaja's College.—The Maharaja's College was the first Public School opened in the State. It was established in 1844 during the minority of Maharaja Ram Singh at the instance of Colonel Ludlow, the then Political Agent at Jaipur. Its object was to impart to the people of Jaipur, the rudiments of English education along with a know-

ledge of the Vernacular. Shortly afterwards Sanskrit and Hindi Classes were added. In 1865 the College was reorganised by the late Rao Bahadur Kanti Chandra Mukerji, C.I.E., who had then just been appointed Head Master, and its success as an educational establishment of the highest class may be said to date from this period. In 1867 it sent up its first batch of candidates for the Entrance Examination of the Calcutta University. In 1873 it was raised to the F. A. Standard of that University and so became a second-grade College. When the University of Allahabad was founded in 1888, the Jaipur College was affiliated to it up to the B. A. Standard, but the B. A. Classes were not actually opened until July 1890. In 1891 it sent up its first candidates for the B. A. degree of the Allahabad University, three of the candidates being successful. In 1897 the College was also affiliated to the Calcutta University as a first-grade College, and it obtained its first M. A. degree of that University in the following year. In 1900 the University of Allahabad recognised the College as qualified to teach up to the B.Sc. Standard. The College Laboratory contains many good instruments and appliances, and these are being steadily added to and brought up to date. Thus a high class Science education can be given. Indeed the College may boast of being at present the only first-grade College of the Allahabad University in all Rajputana, teaching the highest standards of the University both in Arts and Science.

The results obtained by the College during the last two decades are shown as follows:—

	M. A.	M.Sc.	B. A.	B.Sc.	Intermediate.
1890-99 ...	1	...	41	...	71
1900-09 ...	1	1	47	3	120

The education given is free, and the College is open to all classes of His Highness' subjects. There is a staff of nine Professors, and the students on the rolls number 103. The expenditure during the year ending 31st August 1909 amounted to Rs. 26,570.

Connected with the Maharaja's College are the *Collegiate School* with 714 students; the *Chandpol Branch School* with 423 students, and the *Rajput School* with 15 students. The first two are High Schools teaching up to the Matriculation Standard of the Allahabad University, and the third is a special institution for the instruction of the sons of the Nobles of the State.

The Sanskrit College.—This institution, which was founded in 1852, has now a staff of eleven Professors and 124 scholars. The object is to give to Brahmins only a regular course of instruction in all branches of Sanskrit learning, viz., Grammar, Philology, Philosophy, Logic, Literature, Mathematics, Astronomy, Medicine, the Vedas and Vedic Literature: and the titles of Acharya Shastri and Upadhyay* are conferred on successful students after systematic examinations conducted by eminent

* NOTE.—Acharya is the highest degree obtained, next in rank comes the Shastri, and the lowest is the Upadhyay.

Sanskrit scholars from Benares and Calcutta. The annual expenditure is Rs. 6,557.

Girls' Schools.—The first Girls' School in Jaipur was established by His Highness Maharaja Ram Singh in 1867. This school which is now known as the Jaipur Central Girls' School, met with many difficulties during its early existence arising from popular prejudice. But as the usefulness of female education began to be understood, the opposition gradually subsided, and the school was more largely attended. In 1875 three Branch Schools were opened, *viz.*, at Ghat Darwaza, Gangapol and Huthroi, and in 1877 a Branch School was opened at Amber. All these schools are maintained by the State. In 1898 the first Girls' School under private management, now known as Jain Sarasvati Pathshala, was opened at Jaipur by the Jain community. In 1903 the Presbyterian Mission opened a Girls' School at Sambhar. In 1904 another Jain Girls' School known as Kanya Pathshala, was established at Jaipur. During the year ending 31st August 1909, eleven new private Girls' Schools were opened, four in the Jaipur City, by the Jains, four by the Seths at Ramgarh, Mandawa, Fatehpur and Chirawa respectively, and three by the Missions. The establishment of these Private Schools indicates a growing desire for female education among people, the Jain community taking the lead in the matter.

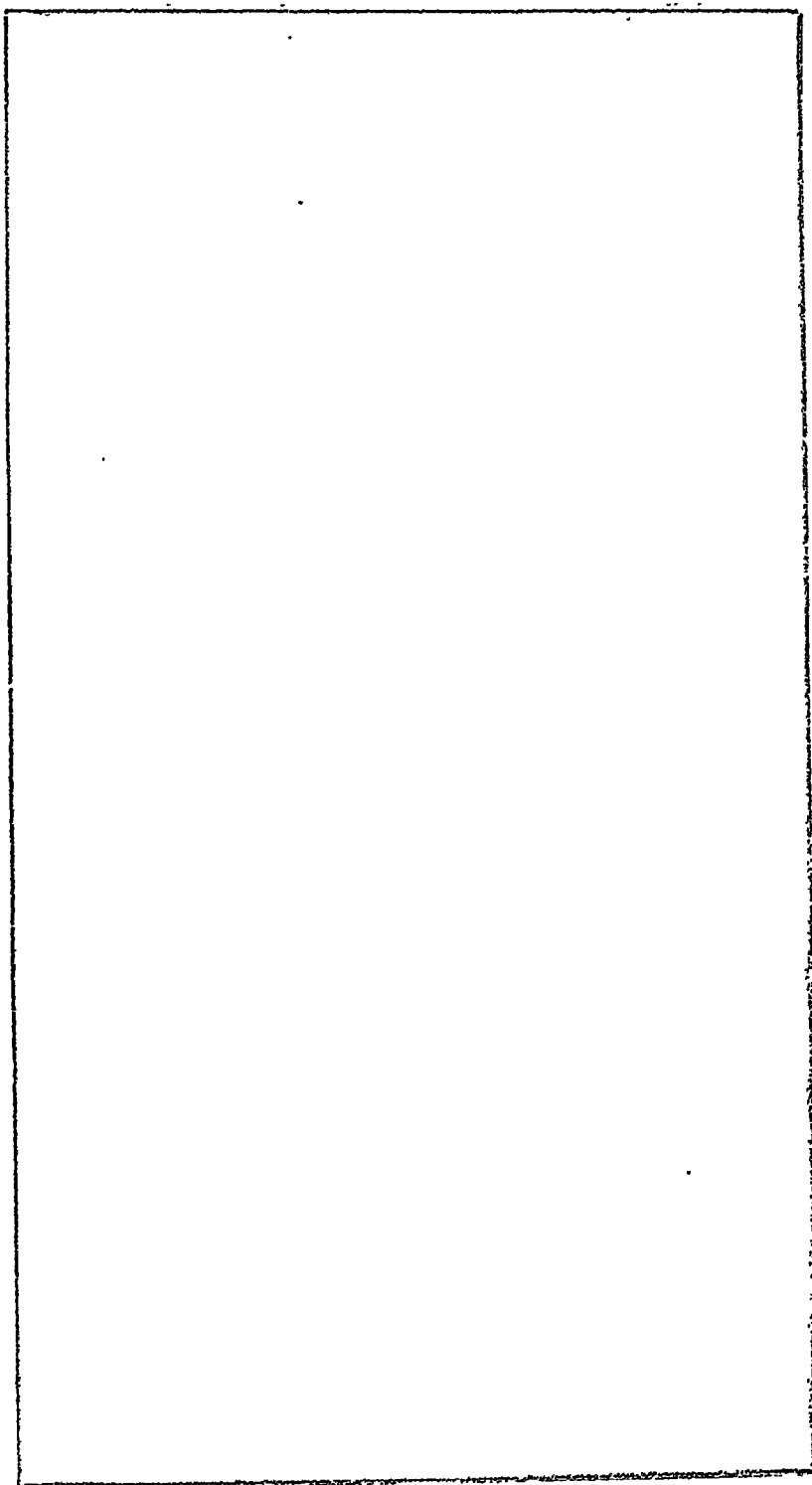
Thus during the year ending 31st August 1909, there were five Girls' Schools maintained by the State with 616 pupils on the rolls and an average daily

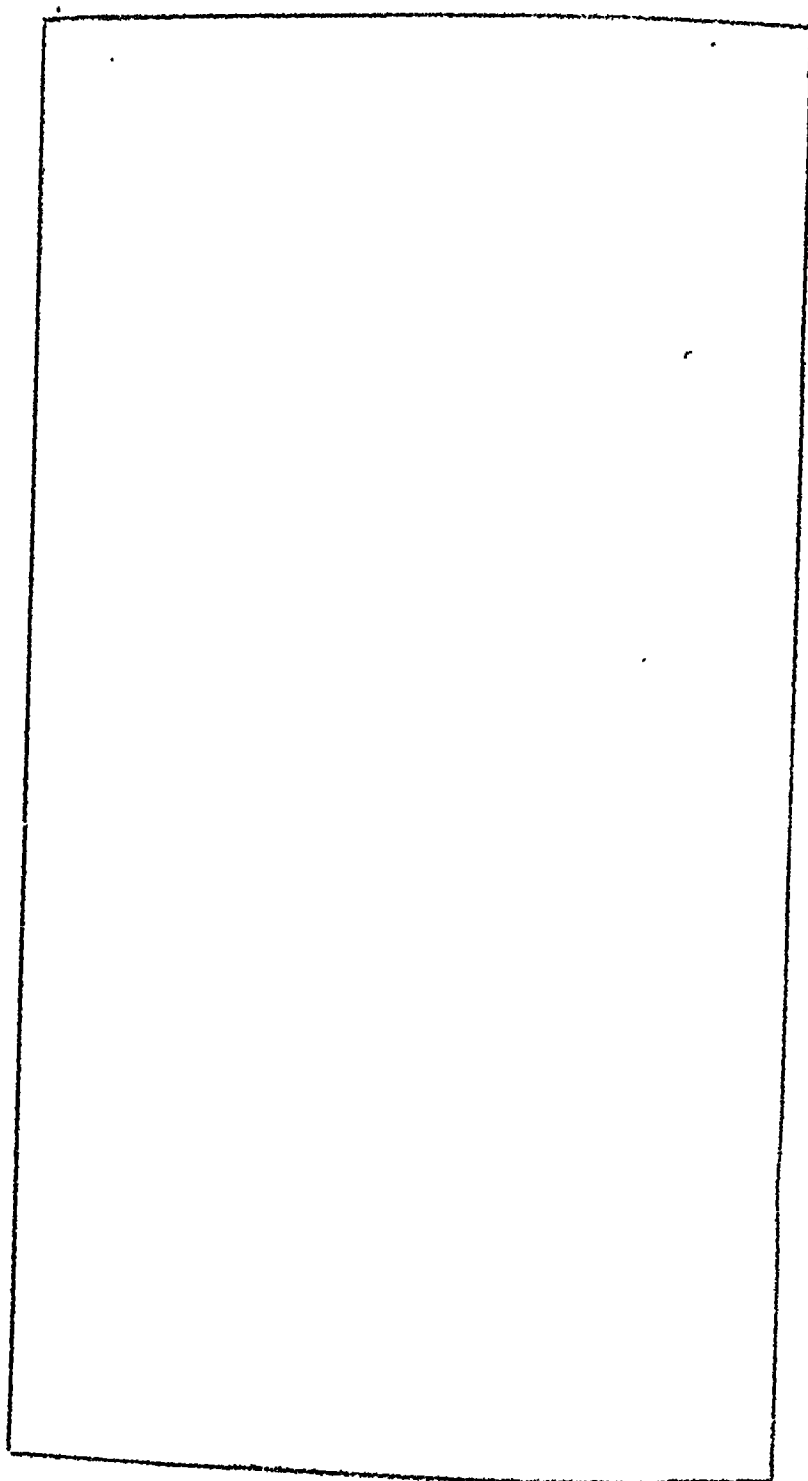
attendance of 361. The Staff consists of a Superintendent, Miss E. Heming, and fifteen Assistant Mistresses.

The curriculum of these Schools includes elementary education in Hindi, Urdu, Arithmetic, Geography, Indian History and Needle-work.

The total State expenditure was Rs. 6,184.

As already indicated there are fifteen Private-Girls' Schools with 628 girls on the rolls and an average daily attendance of 173.





Notes on Jaipur city

CHAPTER VIII

INDUSTRIES OF THE STATE.

JAIPUR is noted for the skill of its artisans and the beautiful work they turn out. Since the foundation of the City, two centuries ago, the Ruling Chiefs have always given great encouragement to arts and industries, and Jaipur ranks first among the States of Rajputana and Central India for the variety and excellence of its productions.

The following are some of the art manufactures:—

Watercolour Painting.—Pictures of Kings, Princes, Queens, mythological deities, native ladies in various costumes, avatars, buildings, and other scenes of Mahabharat and Bhagwat Purans. Price varying from Re. 0-6 to Rs. 2-8 per each piece. All modern works.

Pottery in Porcelain.—Consisting of jars, vases, *surahis*, goblets, tiles, flasks, *lotas*, trays, teapots and *chamboos*, of all kinds and of a variety of colours and patterns. Price varying from Re. 0-8 to Rs. 6 per piece according to the size, glaze and drawing, and design in colours.

Brass-work.—Consisting principally of bazar shapes. Water vessels, drinking cups, cooking utensils, spittoons, water bottles in zinc, idol thrones, and

shrines, &c. Price varying from Re. 1-5 to Rs. 3-8 per seer, according to the quality and the work done.

Carving in Stone (small articles only)—Consisting of mythological figures and deities and avatars in white marbles: also figures of animals, snakes, dogs, &c. Price varying from Rs. 2 to Rs. 25, according to work on each specimen. Marble cups and trays and drinking vessels. Price varies from Re. 0-6 to Rs. 4.

Damascening on Metal—Consisting of goblets, and damascened arms, sword-hilts, trays, including also Tehnishaan work, in gold and silver. Price varying from Rs. 3 to Rs. 35 per each specimen.

Lacquer and Papier-mâché and Painted Toys in Wood—Consisting of figures of elephants with howdahs, horses, camels and other animals. Idol swings and thrones and figures of men and women and other playthings in lacquer as well as in painted wood. Price varies from one anna to Rs. 3.

Cotton Print (Sanganir)—Consisting of Sanganir and Bugru chintzes, handkerchiefs, neckties, sheets, mantelpiece borders, scarfs, coloured yellow, green, blue, pink, and black and white: also bedcovers and dupatas. Price varying from Re. 0-12 to Rs. 5 per piece, according to the fineness of cloth, colour and other excellencies.

Jaipur Coloured Cloths (Choondrics)—Consisting chiefly of turbans and tied cloth sarrees or scarves

called choondri, breast cloths, and *pandiranga lahriyas*, and variegated scarves. Price varies from Re. 1-8 to Rs. 6 per piece.

Jaipur Durries.—Price varies from Re. 1-4 to Rs. 3 medium size. Current rate, Re. 1 per square yard.

Malpura Felts.—Consisting of bedcovers, floor mats, *namdah ghogies* or rain protectors, horse saddles, prayer rugs, round table mats, bathroom mats, all in felt. Price varies from Rs. 2-8 to Rs. 15 each.

Jaipur Enamel Jewellery.—All sorts of native jewellery, and lockets, breast pins, brooches, scent phials and boxes, trays, *attardans*, &c. The ordinary enamel specimens vary between Rs. 23 and Rs. 28 a tola. Ordinary charges for enamelling Rs. 2 a tola, plus weight of the gold.

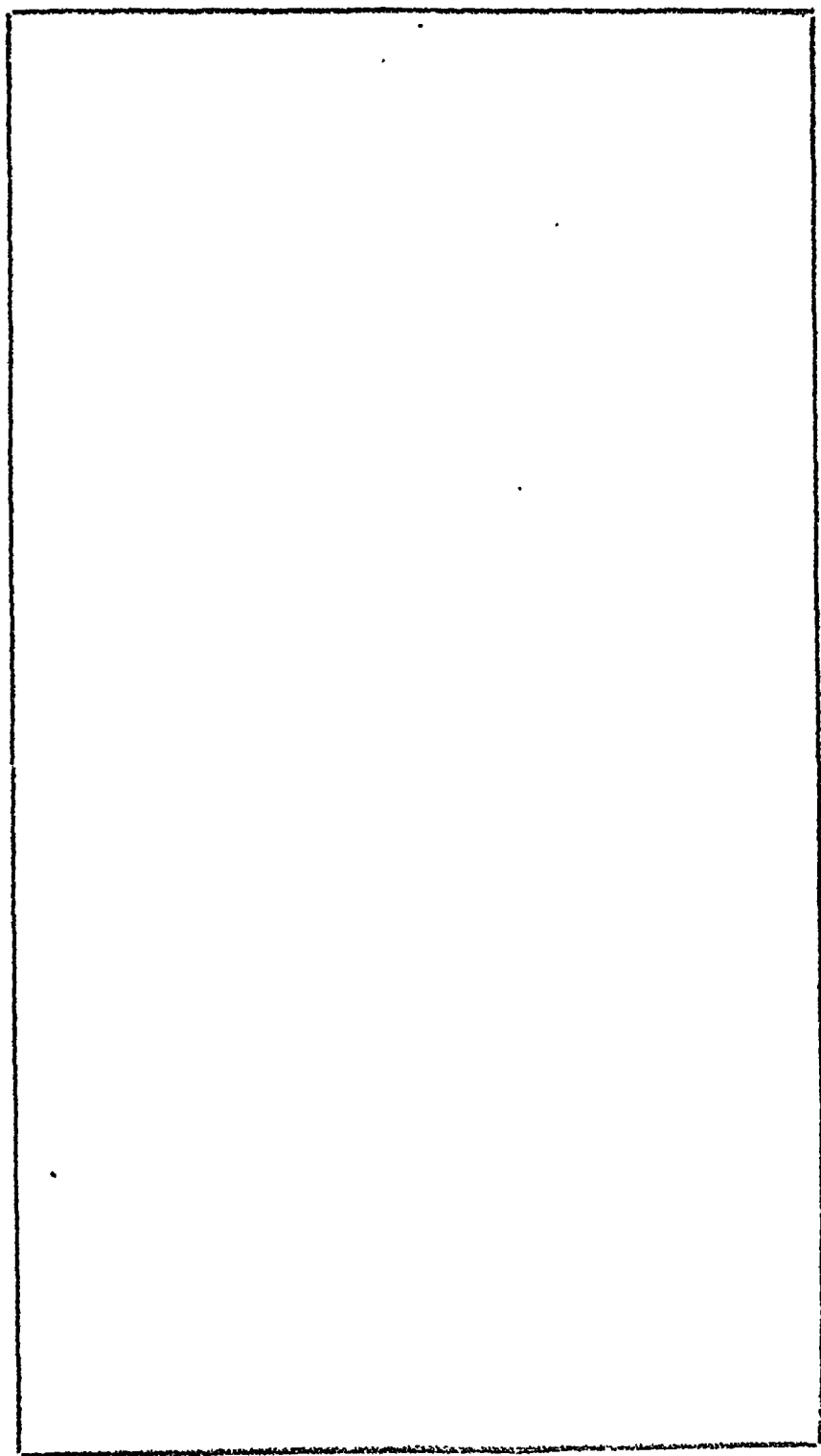
Gold Jewellery.—The workmanship varies between 4 annas to Rs. 2 a tola, plus the value of the gold.

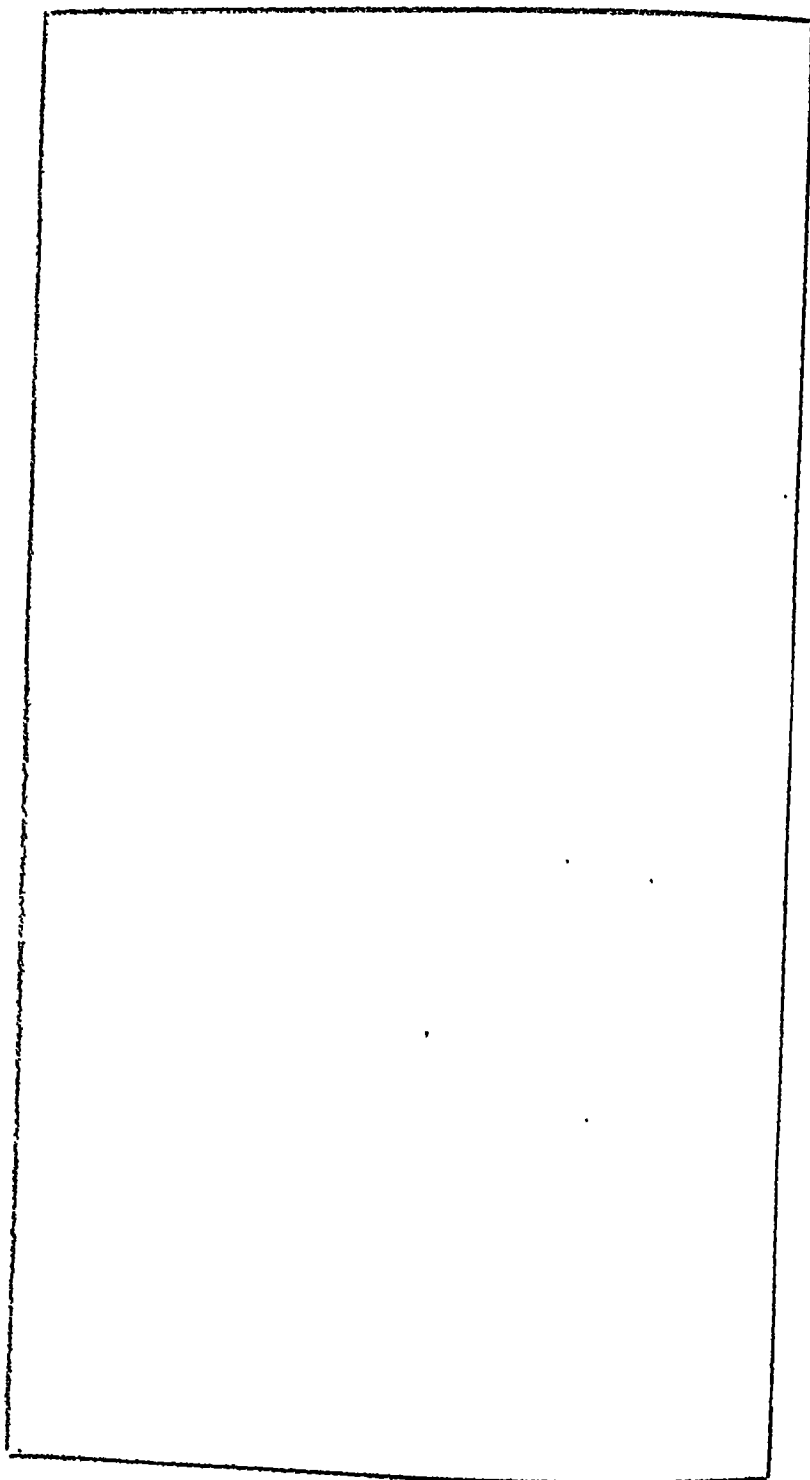
Silver Jewellery.—Half-anna to eight annas, and sometimes one rupee a tola.

New Arms and Weapons.—Swords, daggers, knives, shields, battle-axes, helmets, and other weapons. Price varying between Rs. 2 to Rs. 10 per specimen, according to quality.

Collection of Peasant Jewellery.—Complete set in base metal, zinc and German silver, available for two rupees.

Garnets and Crystal.—Consisting of garnet necklaces, aquamarina and crystal necklaces, and other stones.





CHAPTER IX.

MINERALOGY.

THE greater part of Jaipur belongs to what has been termed from the principal feature in it, the Aravali Geological region.

The rocks, which underlie the sand, and those which crop out above it, belongs to the crystalline and transition series, in which to the present day no fossils have been discovered, and consequently their age has not been determined.

The Vindhyan rocks, from which the red sandstone of the Agra and Delhi forts was taken, touch them in the Hindaun district, and are posterior to them in age. The Vindhyan system is supposed to be older than the old red sandstone of Great Britain, or the Laurentain rocks.

The soil is made up of the debris of these rocks, and towards the east of alluvium, or earth deposited from water, and of sand blown up, it is thought, from the western seas.

In many places the earth is covered with a saline efflorescence known as "reh," which is injurious to cultivation. On the reh soil the phenomenon of the mirage is often seen.

There are numerous salt sources in the State besides the Sambher lake.

Kankar, a concretionary carbonate of lime, of which Indian roads are so often made, is another

product found in abundance in Jaipur. The lime in the kankar is of great value in agriculture, especially in the cultivation of cotton.

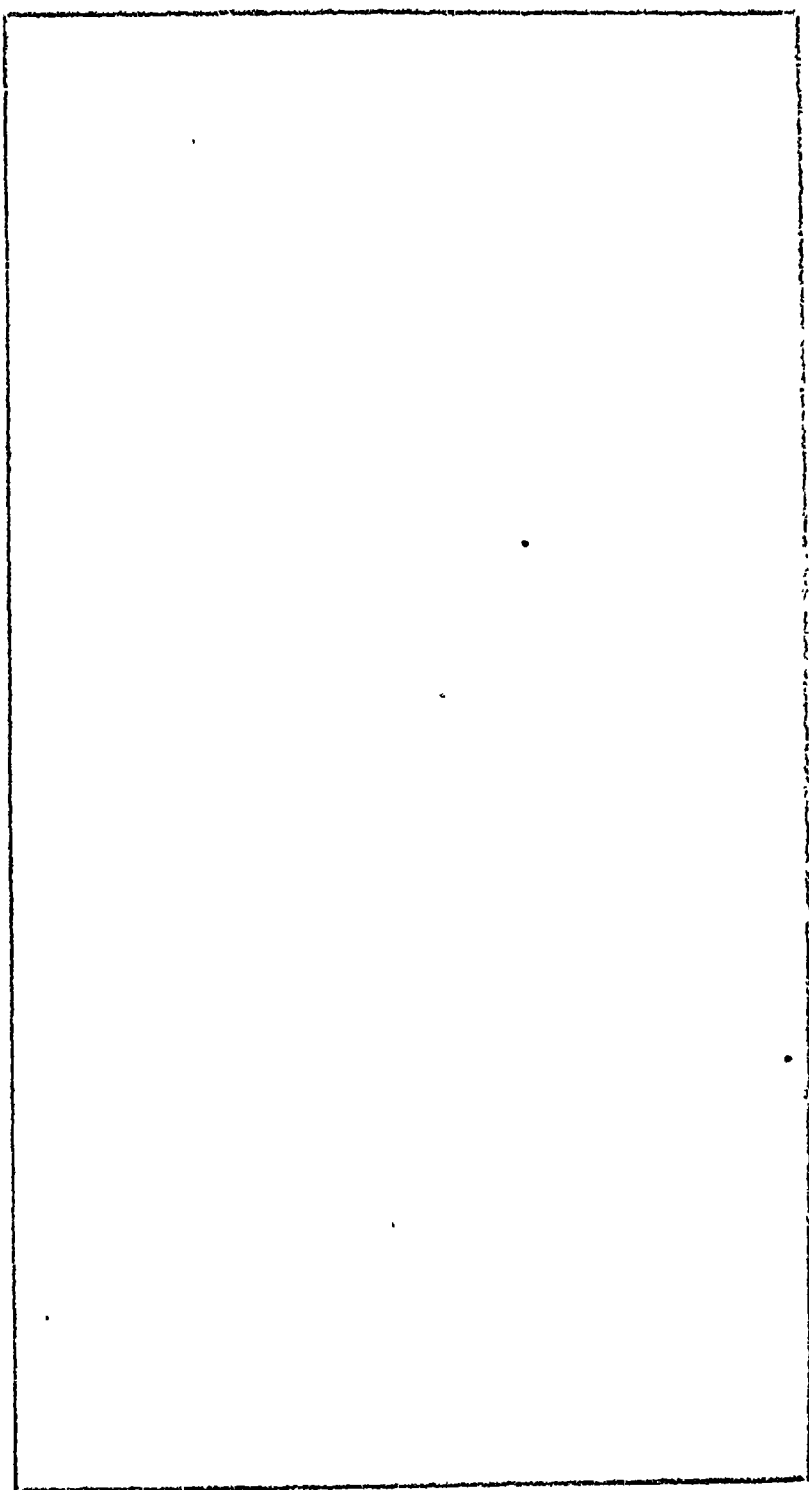
Many valuable building stones are quarried in Jaipur territory. Examples of them in the rough and carved state will be found in the Jaipur Museum.

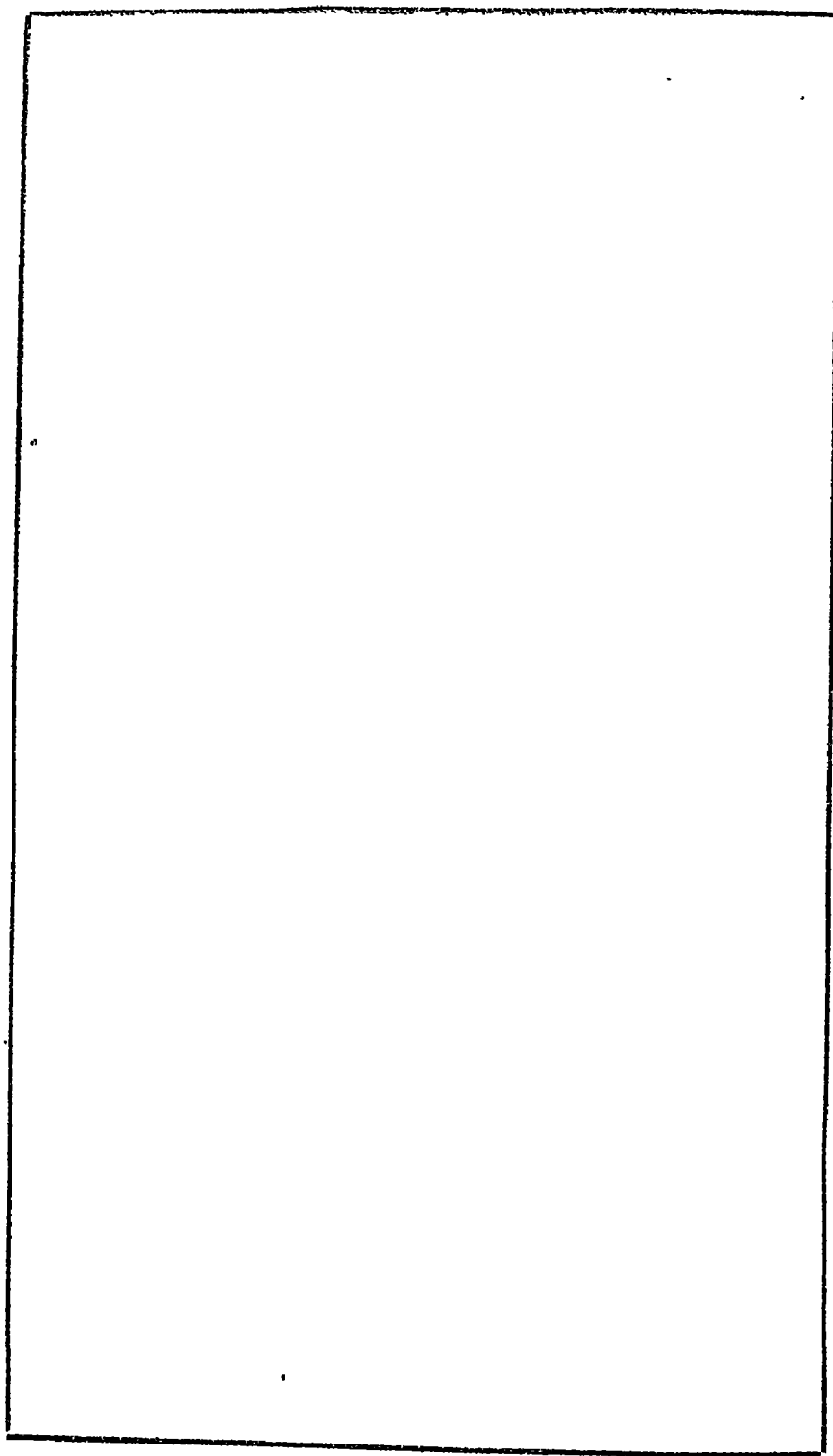
A little sandstone comes from Hindaun near the Bharatpur and Karauli border.

Valuable marbles are obtained from the quarries of Bassi and Raialo in the north-east. Enormous slabs of mica schist, up to 30 feet in length, from the hill of Bhankri, close to the town of Dausa, are used throughout Jaipur for roofing purposes. The steatite, from which the Agra toys are made, is also, Mr. Hacket says, obtained from the Hindaun district of Jaipur. Although the State is not rich in mineral wealth, copper, cobalt, and iron, especially the first two, have been obtained in paying quantities near Khetri. The scarcity of fuel is the chief difficulty in working the ores.

Garnets of the best kind, the finest in the world, it is believed, are found in the Rajmahal hills near Banas, and beryl is also obtained.

NOTE.—This article has been contributed by Colonel P. Durrell Park, I.M.S., Residency Surgeon in Jaipur.





CHAPTER X.

MISSIONS.

THERE are two Missions located in Jaipur: one belonging to the United Presbyterian Church of Scotland and the other Roman Catholic. Besides their mission work proper, the Missions do much medical and educational work in the State, the Darbar willingly acquiesces in and even encourages their presence, and their members form a welcome addition to the European community of Jaipur.

The Mission of the United Presbyterian Church of Scotland was begun by Dr. Valentine in 1866 in Jaipur. Dr. Valentine left the Mission in 1880. The Rev. John Traill came to Jaipur to be the colleague of Dr. Valentine in 1872, and remained in Jaipur till he died this year, regretted by all. The Rev. G. Macalister, D.D., joined the Mission here in 1876, and is still in Jaipur. The Mission is now called The United Free Church of Scotland Mission. According to last report there is a Christian community in Jaipur and the out-station of Sambhar of 244 persons among whom there are 137 communicants. In the High School register, Jaipur, there are 131 names and 70 on the roll of the Anglo-Vernacular School, Sambhar. The boys on the roll of the Vernacular Schools are 215. Attached to the Mission there are generally three European ladies who do zanana work.

The Catholic Mission in Jaipur is one of the most ancient in northern India. We find that there were Catholic priests here in the beginning of the 18th Century.

Bernouilli (Vol. II, Part I, page 54) says that in 1726 the Rajah of Jaipur, Sawai Jai Singh, secured the services of two Bavarian Jesuits—Anthony Gabelsperger and Andrew Strobel who came out from Germany at the Rajah's own expense. It was with the assistance of these learned men and other Jesuits that Jai Singh made himself a great name among astronomers and was able to correct the astronomical tables of De la Hire and leave as a monument of his scientific conquests lists of stars known to astronomers by the name of "Tij Mohammed Shahi"—"Tables of Mohammed Shah the then Emperor of Delhi."

Some of the present Catholics trace back to the same period the settling of their ancestors in Jaipur.

But further particulars on the work in Jaipur of these early missionaries are missing.

In the middle of the last century, Jaipur was without a resident priest and was visited from Agra or Nasirabad.

In 1873, the late Maharaja granted to the Archbishop of Agra the plot of ground near the south-eastern gate of the City, where the chapel now stands.

In 1892, Jaipur was detached from the Agra Mission and included in the new mission of Rajputana and Malwa with head-quarters at Ajmer and entrusted to the French Capuchins.

The last census gave for Jaipur the total of 108 Catholics, distributed as follows:—

Eurasians	...	...	...	54
Goanese	...	...	...	7
Hindustanis	...	...	...	47

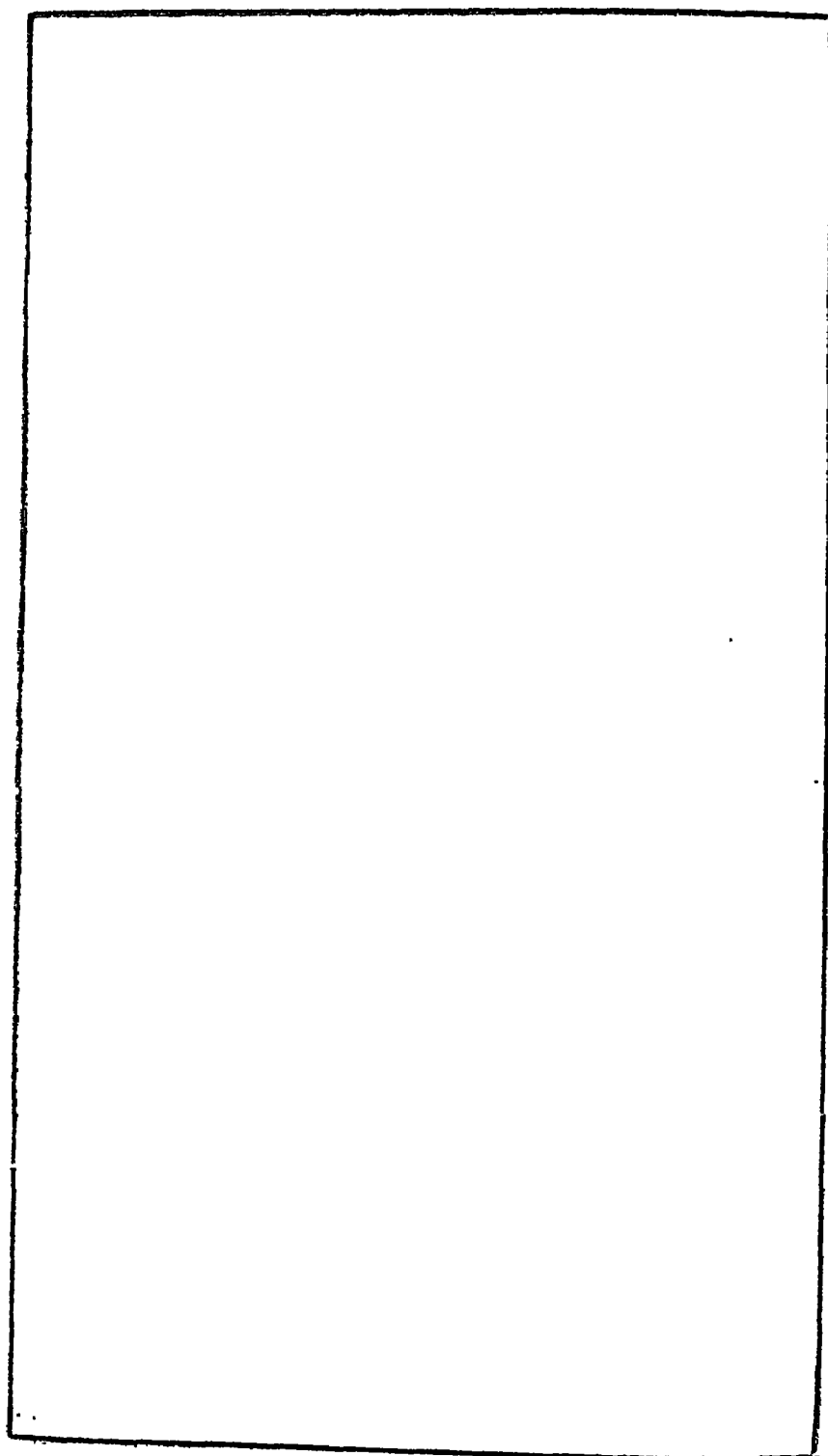
Adjoining the chapel is St. Joseph School with 30 free boarders—mostly Bhils. These boys are trained as Catechists and Schoolmasters and intended to be used in the capacity of general helpers to the missionaries working among the Bhil tribes of Central India.

Staff—Rev. Father Hippolytus, O.C.

Rev. Father Benedict, O.C.

Rev. Brother Eustace, O.C.

The Jaipur Darbar contributes a monthly allowance of Rs. 60 towards the support of the Chaplain. All other expenses are defrayed by the Superior of the Rajputana Mission.



CHAPTER XI.

THE METEOROLOGICAL OBSERVATORY.

THIS institution ranks as a first class Meteorological Observatory, and it was erected and fitted out at considerable cost by the Jaipur State. The late Maharaja first opened an observatory within the Palace grounds, but as the site was unsuitable, the institution was removed in January 1881 to its present site near the Residency Surgeon's house where the conditions are more characteristic of the surrounding country. Reports of all observations recorded are sent to the Government of India, and as according to Mr. Blandford, Jaipur occupies probably the most continental position in the Peninsula, they are doubtless valuable. Each morning throughout the year observations taken at 8 o'clock are telegraphed to the Simla and Bombay Meteorological Departments.

Observations are made every six hours of all the usual instruments, which are placed in a shed open at the sides. The temperature of the soil on the surface is also read by the three observers, who form the staff. An improved Osler's anemograph has for twenty-eight years given a continuous record of the velocity, force and direction of the wind, as well as of the rainfall, by means of brass pencils which make traces on metallic paper placed on a revolving drum moved by clockwork.

The annual expenditure is about Rs. 3497. His Highness the Maharaja, who is much interested in the institution, constantly consults the daily register which is sent to him.

Simple meteorological observations are also recorded at the various dispensaries in the district and reported to the head-quarter station at Jaipur.

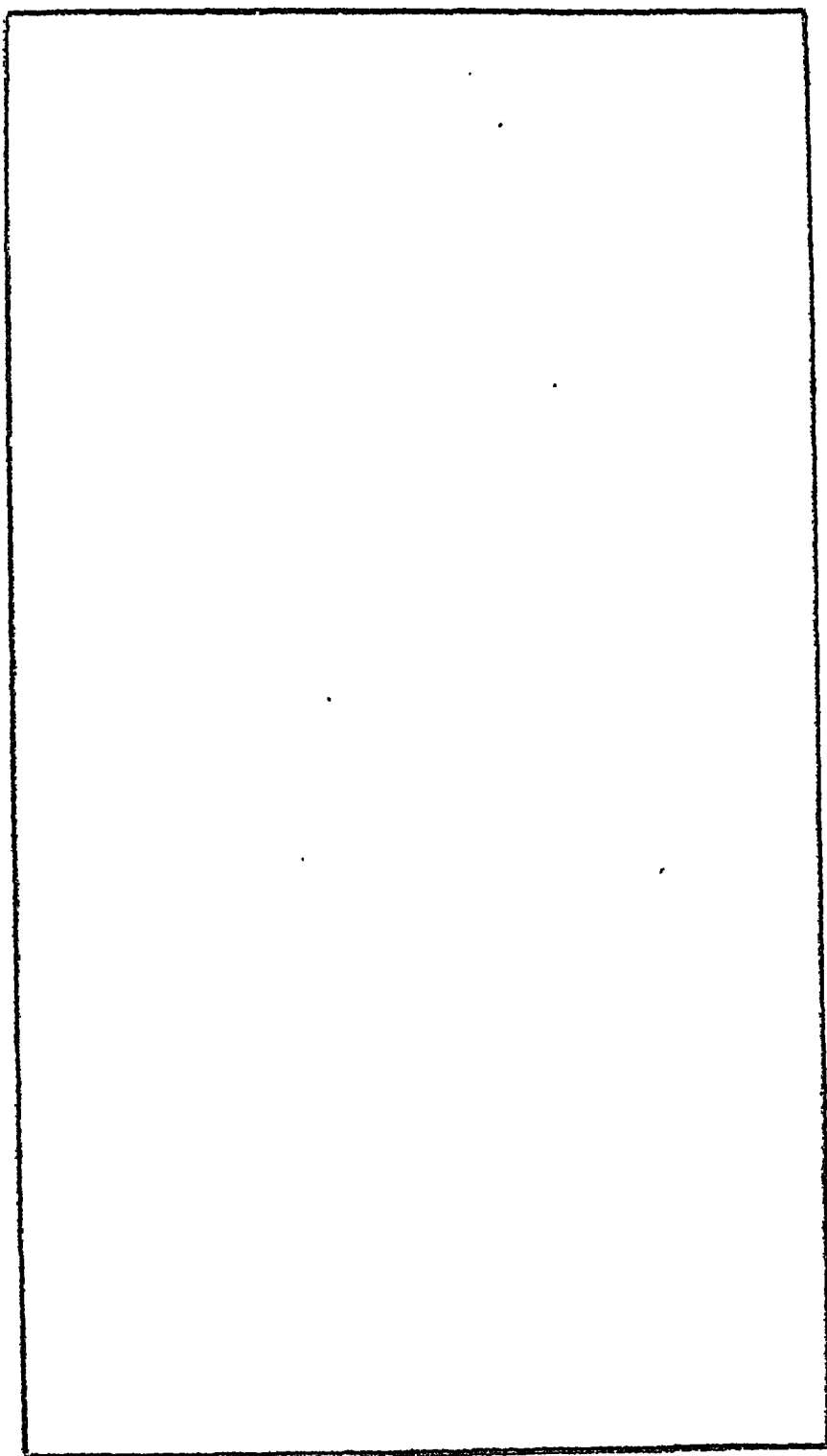
The principal instruments used in the Observatory are :—

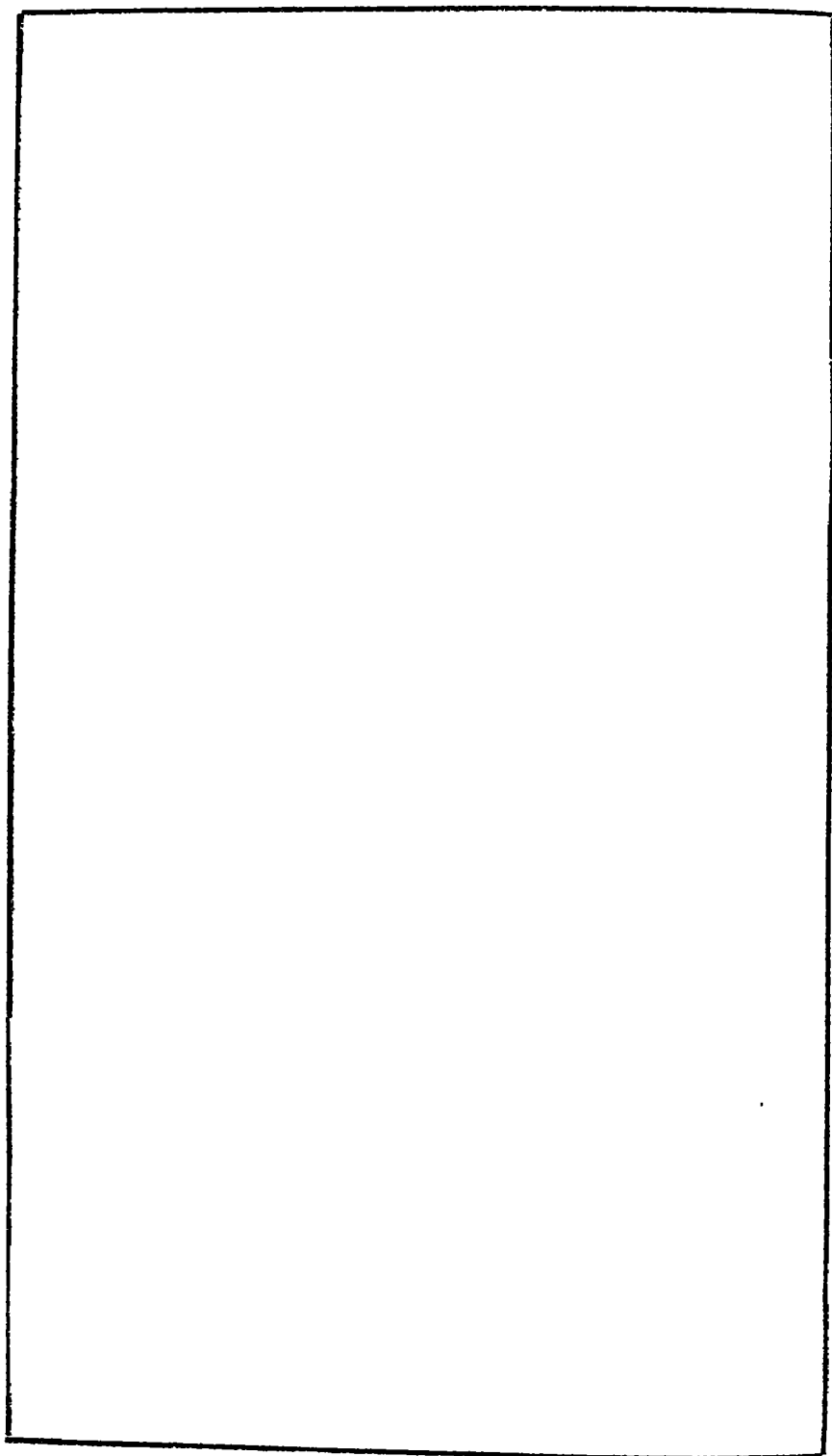
ORDINARY INSTRUMENTS.

Fortions barometer by Casella.
 Standard thermometer by Casella.
 Dry bulb thermometer by Casella.
 Wet bulb thermometer by Casella.
 Dry Maximum by Negrette & Zambra.
 Dry Minimum by Negrette & Zambra.
 Wet Minimum by Negrette & Zambra.
 Sun thermometer by Solomon & Co.
 Thermometer on grass by Solomon & Co.
 Rain-gauge by Symon.
 Nephe and cope by Fineman.
 Sunshine recorder by Negrette & Zambra.
 Surface thermometer by Casella.

AUTOMATIC INSTRUMENTS.

Osler's anemograph by Black & Murray.
 Dine's pressure tube anemometer by R. W. Munro.
 Barograph by Richard Freres.
 Thermograph by Richard Freres.





CHAPTER XII.



RELIGIONS.

A STRIKING feature of Jaipur is the number and variety of its temples. There are over one thousand temples, and the city and its people are famed for their piety, much as Benares, Brindaban, &c., are famed. The rulers too have always been piously inclined; but notwithstanding this they have also been noted for the broad tolerance displayed towards other creeds. There are thus many religions represented in Jaipur, the Mahomedans alone numbering one-fifth of the whole population. The majority of the Hindus are Vaishnawas or believers in Vishnu and his different incarnations. Vishnu, the Preserver, is one of the Hindu Trinity or God-head. Next come the Shaivites or followers of Shiva, the destroyer, the third of the Trinity. Then rank the Shaktus or the devotees of Shakti (or Devi), the wife of Shiva or Mahadeva. After these may be mentioned in point of numbers the Jains, the Dadupanthis, Jogis and Sadhus (of different sects) and the Arya Samajis.

The following is a brief description of the sects of Hindus to be found in Jaipur:—

1. The Vaishnawas.

These believe in Vishnu as being the Lord Creator and Preserver of the universe. As idols they have the image of Vishnu with his wife Lakshmi repre-

sented as lying down on Shesha the great many-hooded serpent floating on endless oceans and from whose navel shoots out the prime lotus bearing on its blown flower the god Brahma with his four mouths and four hands each holding one of the four Vedas. They also worship Ramchandra and Srikishna the incarnations of Vishnu, and their images are also worshipped. There is also Rama, the Prince of Ayodhya and the most virtuous and powerful Prince of ancient India in whose heroic praise the great epic the Ramayan is sung, and whose laws and precepts are followed to this very day. He is worshipped with his wife Sita (incarnation of Lakshmi), and sometimes grouped with his younger brother Lakshman and his faithful devotee the great Hanuman, who helped him in conquering Ceylon. Hanuman is also worshipped separately, and many shrines and temples in Jaipur are dedicated to him. Rama or Ramchandra is the great ancestor of the Kuchhawa Rajputs of whom the Maharaja of Jaipur is the head. The Vaishnavas (followers of Rama) are distinguished for the purity of their lives. They wear two white or yellow vertical marks with red or yellow in them . The followers of Krishna use another and thinner mark thus  with a round dot inside it. They also wear *Malas* (rosaries) of the *Tulsi* plant, lotus seeds, &c. There are four principal Sampradayas or sects of Vaishnavas, viz., (1) Ramnujas, (2) Nimmarkas, (3) Madhwas, (4) Gokulasthas. The followers of all are to be found in Jaipur. The Nimmarkas are the oldest sect but in point of numbers the Madhwas and Gokulasthas rank first.

The Ramawats and Ramnandis with their different offsets, as the Kavirpanthis, &c., belong to the first-named sect. Their chief shrines in Jaipur are those in the Galta and that of Balanandji, Ramchandraji, &c.

The principal *gadi*, or seat of Guru, is at Rewasa, a town in Jaipur, while their most important shrines in Jaipur are those of Shreeji and Gopalji.

The Madhwas are divided into different classes and have their principal seats in Bengal, Orissa, Muttra, Brindaban, &c.

In Jaipur the temples of the Goria section are those of Govindji in the Palace, Gopinathji in Puranibusti and Binodi Lalji, &c., near the Tripolia. Pilgrims from Bengal and other places visit these shrines and are largely supported by the State.

The Gokulasthas' big shrines do not now exist in Jaipur, though there were two formerly: one Gokuleshji is now at Kotah; and the other, Madanmohanji, now at Kama. The shrine of Govardhanathji in the Hawa Mahal is the only shrine of this sect at Jaipur. The seven principal *gadis* or seats of this sect are the two named above, and five others, Mathuresh and Vithalnath at Kotah, Dwarkanath at Kankroli (Udaipur), Srinathji and Nawanihpriya at Nathdwara.

The Ramanujis are worshippers of Rama, while the three others (Nimmarkasi, Madhwas and Gokulas) are worshippers of Krishna, and show very small differences. Rama or Krishna is the impersonation of the "Purush" or the First Power, and Sita or Radha that of "Prakriti" or "Maya," Nature or illusion. They both are eternal and the prime causes

of the origin, existence and final disappearance of the universe. Salvation is obtained by devotion to these and by leading a pure, unblotted life. These cults are famous for the regularity and punctuality of their daily worship, the rich offerings to their deities, and festivities observed on the holy days dedicated to each.

A section of the Nimmarkas also serve as a Militia in Jaipur, and are stationed in Torawati; they look like the Nagas of the Dadupanthi sect.

Originally all these sects had no distinction of castes; any man who was converted a Vaishnava was regarded as a brother, and even now the same law is followed with more or less force though the caste system has exercised its influence, so that Brahmans have got the predominance in all matters. While taking the Mahaprasad (the edibles tasted and approved by the Lord), all members of the sect can sit at the same place as members of the grand Brotherhood, no matter to what caste they belong, and are purified by the ceremony.

For many centuries a very great controversy existed between the Vaishnavas and the Shaivites (followers of Mahadeva), but time has gradually toned down the bitterness of feeling, and now each sect reverences the deity proper to the other as well as his own.

2. Shaivites.

The Shaivites are the believers in Shiva (the blessed), also called Mahadeva (the great god), the third destroyer of the Hindu Triad. He is repre-

sented with the Vedas as "Rudra" the terrible and in the Puranas as the "Merciful." He is an impersonation of the Majesty and Wrath and Power of God and is worshipped mostly in the form of a "Linga," a long cylindrical emblem representing the form of the universe. This "Linga" or "Pind" is firm and immovable and should not be removed from the place where it is erected. The Linga image is surrounded by the images of Parvati, wife of Shiva; Ganesh (god of fortune) son of Mahadeva; Kartik (god of war), another son of Mahadeva; the Nandi or Nandia (the bull) who carries Mahadeva; also Sinha (the lion) on whom Parvati rides. Offerings and worship take place generally in the mornings and evenings. The merciful "Bholanath" (another epithet of Shiva) is pleased with a simple pouring of water with sincere devotion of a worshipper, and grants what is desired by him. In principle, salvation is obtained by assiduous devotion and meditation and leading a life of pure morality according to the injunctions of the codes.

3. Shaktas.

Parvati (also called *Devi* or *Mata*) is another name of Shakti, whose followers form the sect of Shaktas. Just as in Vaishnavas there is a class who believe Lakshmi (wife of Vishnu) to be the only Adorable Deity who can save man, so this sect of Shaktas is only an offset from the main stock of Shaivites and believe that Devi is the only object worthy of worship and capable of granting salvation, &c. She is also worshipped under the name of

Kali or Mahakali and has her shrine at Amber where she is known by the name of *Shila Devi* (the goddess of the slab). A goat is sacrificed to her every morning, and her image, with eight hands riding on a lion and killing the demon called *Mahisasur*, is most awe-imposing. Her famous shrines are at Calcutta and Nagarkot (in the Himalayas). The influence of this sect is evinced in there being in every family of all Hindu creeds one household or family *Devi* or *Mata* called also *Kula Devi*, who is generally worshipped twice in the year with great festivities. The *Kula Devi* of the Kachhawas is *Jamwari*, whose principal shrine is near Ramgarh about ten miles to the north-east of Amber. Just as there are different names, incarnations and forms of Vishnu and Mahadeva, so are there of Parvati. *Nava Durgas* (nine goddesses), also called *Mavalis*, are the nine different deities of the sect, and according to the Tantric system the *Devis* have the power to assume any of these forms to help her devotees. The *Shaktas* and *Shaivites* conjointly have another class called the *Bam Margas*, who believe that salvation can be obtained by the use of psychic forces through their own peculiar methods, in which the use of Mantras, wines, flesh, fish, and woman is necessary. There are still a few of them to be found in Jaipur.

4. *Ganpatas*.

Ganesh, the god of fortune and success, is also worshipped separately, and his followers are called *Ganpatas* and are to be found in numbers towards the Deccan, but some people in every part of India

belong to this sect. But what is worth noticing is the fact that this god is worshipped by every Hindu to whatever sect he may belong. Ganesh is worshipped first of all other gods of the Hindu Pantheon, and at the beginning of every great undertaking, and his image is placed at the top of every door in a niche and worshipped either every day or once a year on the date of his birth (in September). His image can easily be known by his elephant head and four hands and the mouse (the emblem of his vehicle) underneath, and also his two female attendants called Ridh (fortune) and Sidh (success). A discerning eye can easily understand the hidden meaning of this concrete representation. Ganesh is "intellect," the elephant having the biggest head, and head being the centre of brain power; only a high degree of intelligence can secure fortune and success, and they are shown in the female attendants. The four hands are the usual part of a god's body showing him to be double or far ahead of humanity; the mouse, restless, quick and vigilant, indicates the mind that never rests, and the penetrating habit of the animal fairly represent penetrating powers of big brains from which nothing is hid. There is a very big statue of Ganesh at Moti Doongri, the hill to the south of the city, about a mile from the Residency, and there are other noted temples in the city and on the hills. The elephant's head is stated in mythology to have been placed on Ganesh by his father Mahadeva, at the request of the mother Parvati, in place of the real head that was cut off by the father in a fury and was lost.

5. *Sanras.*

These are worshippers of the sun-god who is called Surya (or Surajji). He is the manifestation of the Divine light and is represented as driving a brilliant chariot drawn by twelve white horses, his driver being the lame Aruna (the twilight). Surya was the first ancestor of the Rajputs, called after him Suryabansis (solar race); the Kachhaws are of this class. The temples of the Sun are many in Jaipur, the most noted is that on the Galta hill to the east of Jaipur.

6. *Jains.*

The Jains are also called *Sarawagis* (correctly *Shrawaks*). They amount to about half a lac in population and form an important factor in the official and commercial classes in Jaipur. There are many noted temples of Jains throughout the City and districts.

There are two important sub-divisions of them in Jaipur: called *Digambaris*, who are generally called *Srawagis*; *Setambaris*, known popularly as *Oswuls*. The former are more numerous.

The Jains believe in the twenty-four *Jinas*, also called *Tirthankars* or *Arhats* (like the twenty-four *Avatars* of the Hindus), meditation on which is helpful in obtaining *Nirwan* or salvation. According to them Time, Space, Soul, Matter and Action (*Karma*) are eternal, and the relation of the soul and action is inseparable until the soul obtains salvation, or is freed for ever, from the effect of action by religious practices, self-denial, and mental absorption, &c. They uphold the belief in transmigration very rigidly, and are total

abstainers from the use of flesh and wine. Knowledge (*Gyan*) is held in highest respect, and *Karma* or action is the watchword of their philosophy. Their guiding principles are not to sacrifice any animals, and so they deny tenets of the Vedas which advocate sacrificial rites. They do not believe in the creative power of God, and suppose the universe as self-existing and self-developed.

One of their Tirthankars, Mahavirswami, was the contemporary of Budha and was the first to develop the religion.

Their religious books are in Sanskrit, Prakrit and Pali and also in Hindi. Almost every temple has got a library, and the greatest care is taken by the community to preserve their temples so that they are to be found less neglected than those of the Hindus. Parasnath, Neminath and Rishabhath are the more popular *Jinas*, and generally worshipped. They deny the teachings of the Brahmins. Their mythology is for the most part more dogmatic and extravagant than that of the Hindus. They have got systems of gods, demi-gods, devils and sorcery like the ordinary Hindus. They keep rigid fasts, and are strict in worship. They believe that there are two suns and moons

There is a class of Jains called Dhundias who are very austere monks. They dress in white, keep one or two pots. They use a cotton broom and wear a bandage on the mouth to save insect life, and walk bare-footed and never use a conveyance. Razors for shaving are forbidden, and the hair is plucked out with the hands.

They are a community with no caste system, but now do not proselytize, though originally they were formed out of different castes and creeds.

The charitable habits of the Jains are proverbial, and they are the most innocent and intelligent of the inhabitants of India from a religious and intellectual point of view.

Time has altered their rules somewhat, and their religious and marriage functions are in accordance with Brahminism for the most part though there are some exceptions to this rule.

10. Dadupanthis.

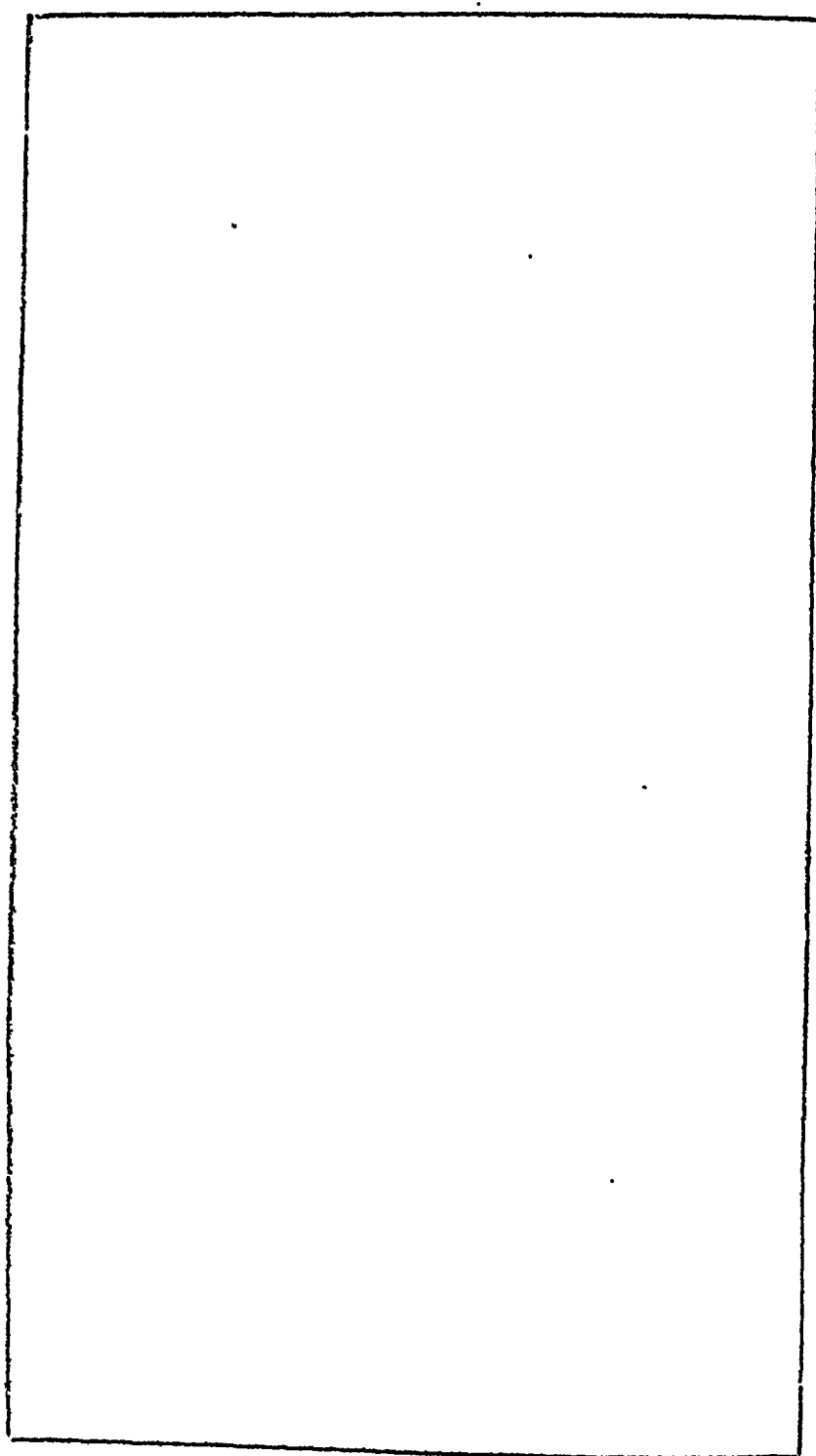
Most of the Dadupanthis form an important militia of the Jaipur State and are called Nagas.

They are the followers of Dadu, a Hindu divine of Ahmedabad, who flourished from 1544 A.D. to 1604 A.D. in the Jaipur State, and founded by his marvellous teachings a monotheistic order of followers who practise celibacy and are noted for their austere lives.

He, like Kabir and Nanak, was a reformer of note, and forbade image worship, distinction of castes, marks of religious sects and implicit belief in religious books such as Vedas, Kuran and Puran. Blind faith in religious preachers, the recognition of Avatars of God and so-called prophets were also forbidden. He preached that there is only one true God, who alone should be worshipped. Purity of mind is the only means of attaining to the truth and the only shrine of God is "self." "Do not find God outside, He is in thee," was his motto. "The heart

is the entrance to the place of my Lord (Swami) His preachings are transcendental and pure, and his language (embodied in a book called Bani of 5,000 verses), the sweetest in the Hindi literature and second to none.

He left fifty-two disciples and each founded a monastic order called a "Thamba." The Naga militia are the followers of Sunder Das the elder. Sunder Das the younger was one of the most popular of Hindi Poets.

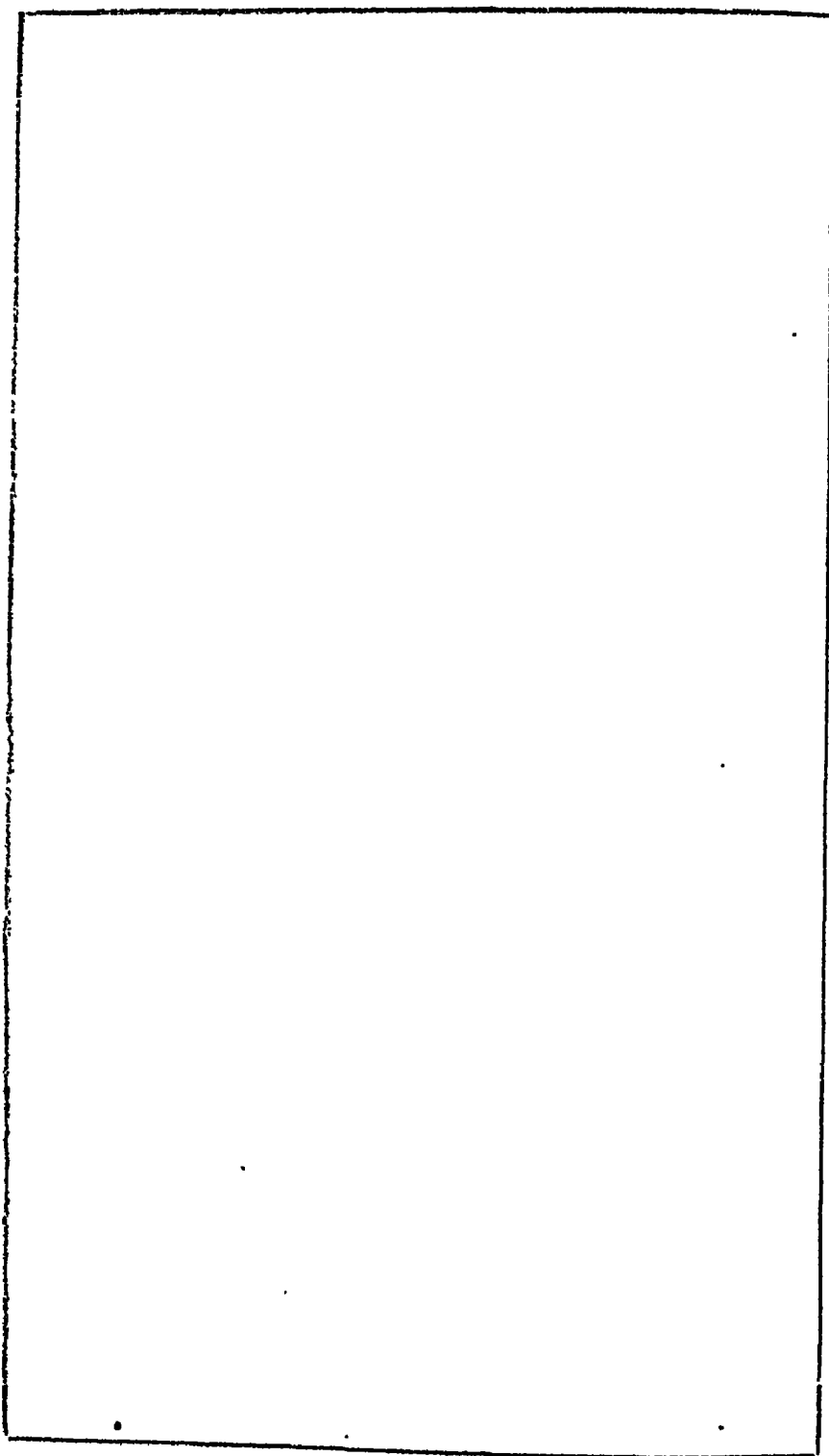


CHAPTER XIII.

THE SAMBHAR SALT LAKE.

THIS remarkable lake, which is a shallow depression some 90 square miles in area, lies on the borders of Jaipur and Jodhpur States and belongs partly to the one State and partly to the other. It is reached by rail from Phulera on the main line of the Rajputana-Malwa Railway, the town of Sambhar from where the lake begins being five miles distant from that place. The affairs of Sambhar town and the surrounding country are conducted by a *Shamlat* or joint administration of Jaipur and Jodhpur officials; but the Salt Works are under an Assistant Commissioner of the Salt Department and a large staff of subordinates.

The Government pay the two Darbars mentioned for the lease of the lake a sum of Rs. 7,00,000 a year (Jaipur 2½ lacs and Jodhpur 4½ lacs). The average annual output of salt is about 1,26,000 tons; and the net income derived by Government from all sources is on the average about 88,00,000 rupees.



CHAPTER XIV.

HINTS TO VISITORS.

THERE are two hotels in Jaipur: (1) The Kaiser-i-Hind Hotel, situated close to the Railway Station, near the Post Office, which stands within railway limits; (2) The Jaipur Hotel—this building is about a mile from the Railway Station, nearly half way to the city, and is close to the Government Telegraph Office. Carriages can be had at both hotels.

The Church is passed on the road to the Jaipur Hotel, a Chaplain officiates on every second Sunday in the month, and there is also Divine Service once in the day on other Sundays. The hours of service are notified at the hotels.

There is a Roman Catholic Church, with a resident Chaplain, near the Central Jail.

There is a branch of the United Presbyterian Mission at Jaipur, with two missionaries, a Zenana Mission and Schools; the mission compound is on the Agra and Ajmer road.

The city gates are opened for vehicles about day-break, and are closed two hours after sunset. Foot passengers can enter or leave the city up to 11 P.M.

Immediately on arrival, travellers should ask the proprietors of the hotels for forms of application to

NOTE:—This article has been contributed by Colonel P. Durrell Pank, I.M.S., Residency Surgeon, Jaipur.

visit Amber, the old capital, and other places of interest, for which permission is required. These forms, when filled up, should be forwarded to the Resident, who countersigns them, and sends them on to the Vakil, or representative of the Jaipur Government at the Residency for favour of the issue of necessary orders by the Darbar. There should be an interval of twenty-four hours between the sending of the application to the Residency and the time fixed for the visits to the respective places.

The Resident himself returns a pass of admission to the different places to the applicant. This pass is shown when required. It takes from 4 to 4½ hours to see Amber properly, and the morning is the best time for the excursion.

The Jaipur Palace, Stables, and Observatory can be seen at any time during daylight, but permission to visit them is required.

The Central Jail, which stands about two miles beyond the Jaipur Hotel and the new District Jail, which is about a mile from the Railway Station on the direct road to the city, can be seen on application to the Superintendent or Darogah at the Jail.

The Mayo Hospital, Meteorological Observatory, and the College can generally be inspected by persons interested in such institutions on presentation of their cards.

The Museum in the Public Gardens is open on week days between sunrise and sunset, and on Sundays in the morning and afternoon. Admission is free. It is lighted every Monday evening for an hour or two after sunset. The band of His Highness

the Maharaja plays in the Public Garden for about an hour and a half before dusk every Monday. The picturesquely-dressed crowd which usually attends will interest visitors.

The School of Art in the City, about a quarter of a mile within the Ajmer Gate, is open, admission free, in the winter from 10 A.M. to 4-30 P.M., and in the summer from 6 A.M. to 10-30 A.M. Specimens of local industries may be purchased here, and from several respectable dealers in the city, as, for example, Messrs. Panna Mahomed Alla Baksh & Co., in the Chowra Rasta; Messrs. Zoraster & Co., Bhumia-ka-Rasta, near the Sangar Gate; Messrs. Nur Baksh & Son, Maniharon-ka-Rasta, who have a collection of articles arranged in a very characteristic Indian house.

The School of Art has a show case at the Railway Station.

Sobhag Chand is the leading jeweller and dealer in enamel and precious stones, and will show his stock at his house in the Ghee Walon-ka-Rasta in the Johori Bazar.

There are numerous dealers who take their art wares to the hotels, but of course their prices are not fixed.

The Public Library is open as a free reading room during daylight, except for three hours in the middle of the day. It is in the centre of the city in front of the Tripolia or ordinary entrance to the Palace.

At the bottom of the street facing the Tripolia will be found a fine collection of tigers, most of which

are said to have been man-eaters; behind their cages, but reached from the road on the south of the city, are the Gas Works.

There are two passes in the hills, which contain picturesque palaces, temples and tanks: the first, known as the Ghat, is about four and a half miles from the Railway Station, on the road which passes between the gardens and the city: it can be reached by carriages, and a visit will agreeably end a day in Jaipur.

The second pass, called the Galta, is in the hills beyond the east end of the main street of the city; it can be crossed either on foot or by elephant. There are some picturesque tanks and palaces in the valley.

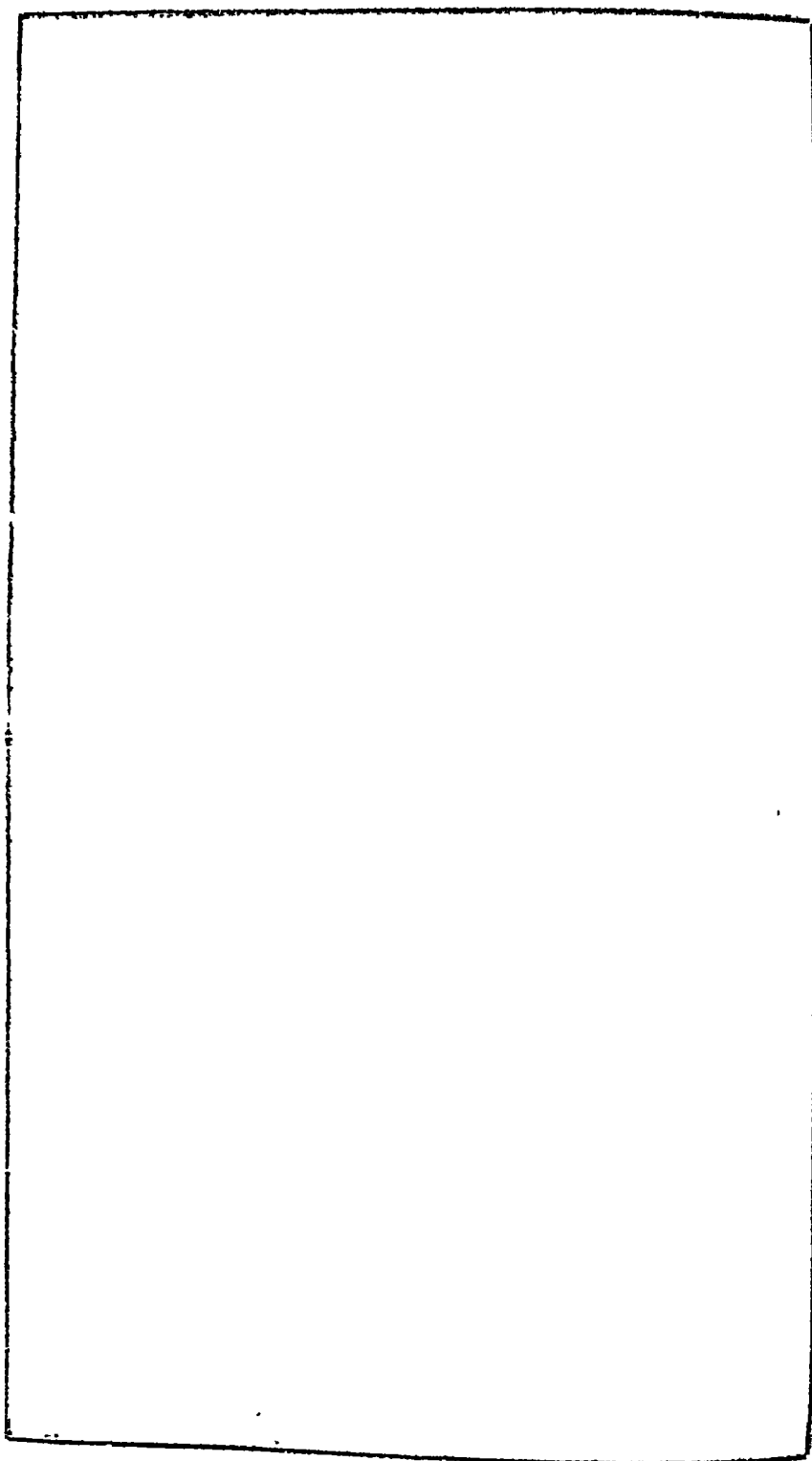
The old town of Sanganir, eight miles south of Jaipur on the Tonk road, contains a very fine old Jain Temple in the style of the more famous shrines at Mount Abu.

For visitors who remain one clear day at Jaipur, the best plan would probably be to devote the morning from daybreak for about four hours, to Amber, and after breakfast to see the Museum, the School of Art, the Palace, Stables, with the Observatory, and the Tigers, finishing with a second visit to the Gardens and the Museum, from the top of which a beautiful view of the city and neighbourhood can be obtained.

To those who can spare a second day, a more leisurely visit to the Museum and School of Art is suggested, and excursions might be made to the Ghat or to the Galta. The institutions can also be examined. The best time to see the city and its

inhabitants is for about an hour or two before dusk; the most picturesquely-dressed crowds will be found near the Manak Chowk, and in the main streets, between the Tripolia and the Sanganir Gate, which is close to the Mayo Hospital.

A notice of the principal industrial arts of Jaipur will be found under Chapter VIII, page 89.



APPENDIX A.

THE JAIPUR OBSERVATORY.

THE Jaipur Observatory is the largest of five which were erected by Maharaja Sawai Jai Singh early in the 18th century at Delhi, Mathura, Benares, Ujjain and Jaipur.

This great Prince, who founded Jaipur in A.D. 1728 and died in 1743, reformed the Calendar for the Emperor, established the obliquity of the ecliptic and the position of the equinox. He patronised art and learning of all kinds, besides taking a prominent part in the political events of his time.

He ascended the throne in A.D. 1699, being then barely thirteen years of age. He was but twenty years of age when Aurangzeb died and a war broke out over the succession, in which he took the part of Bedar Bukt, son of Azim Shah, and fought on their side at Dholpur, where they were both killed, and Shah Alum Bahadur Shah then became Emperor. For this opposition Amber was sequestered and a Governor of the Emperor's sent to take possession. Jai Singh collected an army and drove out the Emperor's garrisons, reconquered his own estates, and formed a league with Ajit Singh of Marwar for their mutual protection.

During most of his long reign of forty-four years

he was engaged in desultory warfare. The power of the Mughals was declining and the increasing influence of the Mahrattas formed a constant source of anxiety. At last when the Emperor Farukhsir refused to accept his help, he retired to his capital and devoted himself to his favourite pursuits of astronomy and history and built the observatories noted above.

In 1739 Nadir Shah's invasion took place, and the Rajputs abandoned the hopeless cause of the Delhi Emperor and consulted their own interests. Jai Singh died in 1843. He lived during a period of anarchy in India but found leisure for historical and scientific research, for internal reform, for encouragement of art, for the building of palaces and cities; and to be able to do this under such circumstances, proved that he was one of the most remarkable men of his time.

The following extracts taken by Captain Garrett from a paper written by Dr. Hunter in Asiatic Researches, Vol. V., page 177, are interesting as showing the spirit with which he studied astronomy.

The first is from the preface to the *Zich Muhammad Shahi*, a set of astronomical tables constructed by Jai Singh at the request of the Mughal Emperor Muhammad Shah.

"Praise be to God, such that the minutely discerning genius of the profoundest geometers in uttering the smallest particle of it, may open the mouth in confession of inability, and such adoration, that the study and accuracy of astronomers who measure the heavens, on the first step towards

expressing it, may acknowledge their astonishment and utter insufficiency.

"Let us devote ourselves at the Altar of the King of Kings (hallowed be His name) in the book of the register of whose power, the lofty orbs of heaven are only a few leaves, and the stars and that heavenly courser, the sun, a small piece of money in the treasury of the Empire of the Most High."

"If He had not enlightened the dark paths of the elements, with the torches of the fixed stars, the planets, and the resplendent sun and moon, how could it have been possible to arrive at the end of our wishes, or to escape from the labyrinth and the precipices of ignorance?"

"From inability to comprehend the all-encompassing beneficence of his power, Hipparchus is an ignorant clown who wrings the hands of vexation; and in the contemplation of His exalted Majesty Ptolemy is a bat, who can never gaze at the sun of truth; the demonstrations of Euclid are an imperfect sketch of the forms of His contrivance."

Sawai Jai Singh continues, "by the aid of the Supreme Artificer he obtained a thorough knowledge

Hipparchus was the first systematic astronomer on record, born, according to Strabo, in Bithynia at the beginning of the 2nd century B.C. According to Ptolemy he is said to have discovered the procession of the equinoxes, determined the place of the equinox among the stars, established the solar and lunar theories, invented the Astrolabe, and to have drawn up a catalogue of about 1000 stars, determining the latitude and longitude of each.

Ptolemy was a celebrated astronomer and geographer who flourished in Alexandria between A.D. 139-161.

of the principles and rules of Mathematical Science." He found the places of the stars, especially the appearance of the new moons, as given in previous tables, did not agree with observation. Seeing that very important affairs both in religion and in the administration of Empire depend upon these things, he represented the facts to the Emperor Muhammad Shah, whom he describes as "the sun of the firmament of felicity and dominion, the splendour of Imperial magnificence, the unrivalled pearl of the sea of sovereignty, the incomparable brightest star of the heaven of Empire, whose standard is the Sun, whose retinue the Moon, whose Lance is Mars, and his pen like Mercury, with attendants like Venus; whose threshold is the sky, whose signet is Jupiter, whose sentinel Saturn, the Emperor descended from a long line of kings, an Alexander in dignity, the shadow of God, the victorious king."

Having received the command to do as he suggested, Jai Singh "bound the girdle of resolution about the loins of his soul," and constructed several instruments such as had been constructed at Samarcand. But finding that brass instruments did not come up to the ideas that he had formed of accuracy because of their smallness, the want of division into minutes, the shaking and wearing of their axes, the displacement of their circles, and the shifting of the planes of the instruments, he concluded that these must have been the causes of the errors in previous calculations, so he constructed large massive masonry instruments to obviate these inconveniences. To confirm the truth of his observations he made similar

instruments in different places where observations were made daily, and he finished his tables in A.D. 1728.

When he heard that observations had been established in Europe, he sent skilful persons along with a Padri Manuel to see what was done, and he procured the new tables which had been by published La Hire in 1702.

In the *Samrat Siddhanta* Jai Singh thus expresses himself:—

“In future whoever be the lord of the realm, he should assure himself by making enquiries into the motions of the heavenly bodies by making instruments. Reliance should be placed on the results obtained by actual observation, taking into account the difference produced by lapse of time, or by the irregular movements of the heavens. He whoever would truly know, should do that, placing reliance on actual observations. For the true motion of the stars is one thing, that obtained by calculation from standard works another. Actual observations only are reliable.”

As Captain Garrett truly says, “Did ever astronomer approach his science in a truer and higher spirit? Assuredly Jai Singh worked to ascertain the truth, and though he made mistakes, still his name stands out as the only Indian astronomer of comparatively recent times who has laboured for the real advancement of the most ancient of the sciences.”

Jai Singh first tried brass instruments, but from various causes found them unsatisfactory, although brass instruments were used in Europe, and the re-

sults appear to have been satisfactory; probably due to the superior workmanship in metals in Europe.

Tycho's (1546-1601) largest brass quadrant was 6 ft. in radius, and graduated to 15 minutes of arc, and his results were very slightly better than those of Ulegh Begh.* In fact there does not seem to be much difference between the accuracy of the two systems, *viz.*, large masonry instruments and smaller brass ones, but the telescope has increased amazingly our powers of accurately sighting.

Jai Singh made no startling astronomical discoveries, nor could this be expected with the means at his disposal. For a thousand years and more the world had been observing with instruments more or less similar to his. There is little doubt that the Hindus and Egyptians, some thousand of years earlier, had employed methods similar to Jai Singh's for determining the north and south line, for measuring the sun's altitude and for determining the latitude.

Jai Singh may be said—

- (1) To have revived Hindu astronomy and given such an impetus to it as had not been

* Ulegh Begh was a Tartar Prince of Samarcand and lived from 1394-1449. He was deeply interested in astronomy, and by means of a gnomon 180 ft. high he determined the obliquity of the ecliptic to be $23^{\circ} 30' 17''$. From the data of modern astronomy the obliquity at that period is calculated to be $23^{\circ} 30' 40''$. Ulegh Begh also determined the procession of the equinoxes to be 1° in 70 years, and constructed a set of tables scarcely inferior in accuracy to those of the Danish astronomer Tycho Brahe. He also produced a catalogue of 992 stars, the third known to astronomy, the two former ones having been constructed by Ptolemy A.D. 139-161, and Hipparchus 2nd century B.C.

known in India since the time of Brahma Gupta in the 7th century.

- (2) He promoted the study of mathematics, history and learning, and collected a large library, the greater portion of which it is feared is now lost.
- (3) He issued a revised star catalogue, reformed the calendar, and produced a set of tables of the sun, moon, and planets of increased accuracy, which are still in use among Hindu astronomers.
- (4) He has left us the most interesting record of all, *viz.*, his instruments.

Jai Singh's observatory has an especial interest because it represents the last of what may be called the stone age of astronomy. Great masonry instruments are never likely to be erected again, and have been succeeded by the metal and glass instruments of the present day.

Maharaja Jai Singh's original brass instruments are now in the Albert Hall Museum.

The first mention of Hindu astronomy is found in the Rig Veda, the oldest authentic Sanscrit manuscript extant, the date of which is supposed to be between 1500 and 2000 B.C.

For some years the Observatory was uncared for, but in the reign of the late Maharaja Sewai Ram Singh, the repairs were begun, and were completed by the present Maharaja Sewai Madho Singh in 1901. A wall tablet gives the names of those who carried out the actual work.

All honour to those who have restored Maharaja Sewai Jai Sing's great Observatory, which is one of the most interesting places in the world.

The following is a brief description of the Instruments, taken from Lieutenant Garrett's Book—the numbers correspond with those given in Plate I., The plan of the observatory. Those who wish to go deeper into the subject are referred to his book, "The Jaipur Observatory and its Builder."

1. THE DAKSHINO BHITTI YANTRA or MERIDIANAL WALL—a Double Mural Quadrant. Consists of a wall placed in the north to south line or Meridian. On the East face are inscribed two quadrants of 20 ft. radius, and on the West, a semi-circle of 19 ft. 10 in. radius. The arcs are made of marble and are graduated in degrees and minutes.

This instrument is used for observing the altitudes of the heavenly bodies when on the Meridian. Fixing a thread to one of the centre pegs, the observer moves the other end of the thread over the arc until the thread is aligned on the object to be observed. At noon a thread is not necessary as the sun being on the meridian the shadow of the peg falls on the arcs.

The reading from the upper end of the arc gives the altitude. From this instrument the sun's altitude and zenith distance at noon, its greatest declination, the obliquity of the ecliptic and the latitude of Jaipur can be ascertained.*

* Where the latitude is greater than the maximum declination,

2. SHASTHAMSA YANTRA—or sextant instrument, so called from the graduated arcs being sextants or 60 degrees in length. There are two pairs of these, one pair being situated in each of the side walls of the huge sun dial known as the Samrat Yantra.

A lofty but narrow chamber is contrived in the thickness of the walls, and access is by a door opening on to the platform on which the Samrat stands.

Into this chamber, no ray of light can find its way except through two small square openings high up in the south walls. Every day at noon the sun shines through these apertures for the space of about a minute, and the spot of light falls on the circular arcs, which are graduated to read zenith distances, and declination.

Thus every day at noon the sun's meridian altitude, zenith distance and declination can be found, and from these the latitude and obliquity of the ecliptic, as explained above.

half the difference of the maximum and minimum zenith distance is the maximum declination or the obliquity of the ecliptic.

In places where the maximum declination is greater than the latitude, the maximum declination minus the minimum zenith distance gives the latitude.

In places where the latitude exceeds the declination, the latitude is the sum of the minimum zenith distance, and the declination is the angular distance of a heavenly body north or south of the equator, measured along the great circle passing through the body observed and the pole.

The latitude is equal to half the sum (or difference) of the maximum and minimum zenith distance.

$Z_1 = L - W$. Where Z_1 is the minimum zenith distance.

$Z_2 = L + W$. Z_2 „ maximum „ „
 L is the latitude.

W the sun's maximum declination,

This instrument is probably the most accurate of all the instruments in this Observatory.

The experiment was tried of closing up the square aperture with a metal plate, punctured in the centre with a pin hole, and this gave a wonderfully sharp image of the sun on the arc, enabling the angular diameter of the sun to be measured to within 15 seconds of the true value. Thus the difference in the sun's diameter in winter and summer could be easily measured, and the sun's image being some 3 inches in diameter, large sun spots would also be visible.

3. RAM YANTRA.—This instrument is used for measuring altitudes and azimuths, and consists of two circular stone buildings, one the complement of the other.

In the centre of each is a vertical rod of the same height as the building itself, and from this rod, at a height of about 3 ft. from the ground, radiate horizontal sectors of stone slabs up to the circular walls of the building. These sectors are twelve in number, and their angle in one instrument is 12° and in the other 18° , while the spaces between them are respectively 18° and 12° .

These sectors are so arranged that the sector in one instrument corresponds to the space between the sectors in the other.

In this manner one instrument is supplementary to the other, and observations can be made at any time that the sun is shining.

The wall of the building consists of a series of twelve pillars connected at the top; the pillars

correspond to the stone sectors and the spaces between them to the spaces between the sectors. The height of the wall above the sectors is equal to the radius from the rod to the circular wall. Hence when the sun is less than 45° above the horizon, the end of the shadow of the rod falls on the walls, and when the altitude of the sun is greater than 45° , the end of the shadow falls on the stone sectors.

The sectors and the walls are graduated to read altitudes direct, the scales being scales of tangents. When the end of the shadow of the rod falls on the walls, the graduations from the top of the walls give the altitude. When the end of the shadow falls on the sectors, the graduations are counted from the rod outwards to give the zenith distance or complement of the altitude.

The sectors and walls are also graduated in degrees of azimuth, the graduations on the sectors taking the form of radiating lines.

Observations can also be taken of stars by placing the eye either on one of the sectors or in the space between the pillars, according as the altitude is greater or less than 45° , so that the top of the central rod is in a line with the star. The position of the eye then marks the position of the star.

This instrument was originally constructed in plaster, but in 1891 it was restored in marble.

4. THE DIGAMSA YANTRA—for finding the azimuth.* It is a circular building 27 ft. in dia-

* The azimuth of a heavenly body is the arc, or circular portion of the horizon intercepted between the north point and the point where a circle passing through the Zenith, or point exactly overhead and the heavenly body cuts the horizon.

meter: in the centre is a solid pillar surrounded by two circular walls. The inner one is made as high as the centre pillar, about 3 ft. high. The outer wall is twice as high as either of the former. These represent horizons. On these horizons mark the perpendicular east to west and north to south lines and degrees and minutes. Stretch tightly two threads across the exterior wall to represent the east and west and north and south lines, intersecting at right angles over the centre of the horizon. At the centre of the pillar, fix securely one end of a string; to the other end of the string fasten a stone and throw it over the outer horizon. This thread is called the "thread of the circle of vision." The observer stands at the circumference of the second horizon and causes the thread of the circle of vision to be moved along the rim of the third horizon, until the thread is seen to intersect the object to be observed and the intersection of the north, south, east and west threads. When this is the case, it is evident that the thread of the circle of vision represents the vertical plane passing through the star, and the azimuth or the number of degrees from the north points can be read off at once from the position of the thread on the graduations of the third horizon.

5. THE SAMRAT—"The Prince of Dials." This is the largest instrument in the Observatory. The gnomon is 90 ft. high, inclined at an angle equal to that of the latitude $26^{\circ} 56'$; the base is 147 ft. long, and is provided with a flight of steps up the

hypothénuse. The radius of the quadrants is 49 ft. 10 inches. The structure is entirely of masonry. The shadow moves at the rate of 13 ft. an hour or $2\frac{1}{2}$ inches in a minute, and the quadrants are graduated to read seconds of time. It is difficult however to read to seconds, owing to the shadow being somewhat ill defined. The reason of this is that the sun's light proceeds from a disc, and not from a point: the result is that instead of the shadow presenting a well defined edge, it tapers off from darkness through every gradation of shade to sunlight. A skilled observer however would probably obtain apparent time correct to 10 or 15 seconds.

On either side of the gnomon and parallel to it, at a distance of about 50 ft., lofty walls were built. From points on the hypothénuse of the gnomon, representing the centres of the upper edges of the quadrants, lines were drawn on both sides of the gnomon at right angles to the hypothénuse. These represent the plane of the equator. Similar lines were drawn on the inner faces of the parallel walls, and from points on these lines, horizontal threads or wires were stretched to corresponding points on the lines on the sides of the gnomon. It is evident that these threads all lay in the plane of the equator, and the iron nails to which they were attached may still be seen on the walls of the Samrat.

A thread 49 ft. 10 inches long being now attached at one end to the point on the quadrant as a centre and revolved about this point touching the series of horizontal wires, the other end traced out the edge

of the quadrant arc, and it was then a simple matter to build the masonry up to this.

After having stood for nearly 200 years, the Samrat remains to this day a marvel of accuracy.

The main use of the Samrat was for finding time. Solar time could be directly read from the position of the shadow on the quadrants, and time could also be obtained at night by observing along a thread, one end of which was in contact with the edge of the gnomon and the other with the edge of one of the quadrants. The reading on the quadrant then gave the time (*i.e.*, the hour angle of the star) that had or would elapse since or before the star had been or would be, on the meridian. As the positions of the star and the sun were known from the tables, a simple addition or subtraction would give the solar time.

Declinations can also be directly observed with the Samrat. Declination merely means angular distance north or south of the equator.

A common method of taking the sun's declination was to place a stick upright on the edge of the gnomon at such a point that the shadow of the stick fell just on the edge of the quadrant. The reading on the scale of tangents engraved on the edge of the gnomon corresponding to the end of the stick gives the declination.

Similarly if a tube or a thread be aligned with any star, one end being on the edge of the gnomon and the other end on the edge of the quadrant, the reading on the former will give the declination, and the reading on the latter, the hour angle of the star.

The Samrat time is always behind railway time; the amount varies from $1\frac{1}{2}$ minutes to 32 minutes.

6. THE NARIVALAYA.—This is a circular masonry dial in the plane of the equator. At the centre of the dial an iron pin is fixed at right angles to its surface and pointing towards the pole. The circumference of the dial is graduated. At noon the shadow of the pin falls on the north and south line; before noon the shadow will fall on the west and after noon on the east. The sun's hour angle or the apparent time can be directly read off from the position of the shadow on the graduated circumference.

Two masonry dials are required, both in the plane of the equator, one facing north, and the other facing south. With the former, the sun is observed when its declination is North, *i.e.*, between 21st March and 21st September). The latter is used when the sun's declination is south, *i.e.*, between 21st September and 21st March.

7. THE RASHIVALAYA.—This is a series of twelve instruments of the same type as the Samrat, *viz.*, a gnomon with a graduated quadrant on either side.

The object for which they were intended is the direct determination of celestial latitude* and longitude.

* The celestial latitude of a body is its angular distance from the ecliptic measured along a great circle, joining the apparent position of the body and the pole of the ecliptic, or roughly the angular distance of the body north or south of the ecliptic.

The celestial longitude of a body is the angular distance

The radius varies from 4 ft. $1\frac{1}{2}$ inches to 5 ft. 6 inches, but it is not known why. The quadrants are graduated and there are scales of tangents on the gnomons. The method of observing is the same as that described for the Samrat.

Just as the quadrants of the Samrat represent the equator, so the quadrants of the Rashivalaya represent the ecliptic.†

The pole of the ecliptic is not a fixed point, but describes a circle of $23^{\circ} 27'$ radius around the pole. Hence a series of twelve instruments was made to enable observations to be taken at twelve periods during the twenty-four hours, or one observation approximately every two hours. It follows that, at only one particular instant can an observation be made with one particular Rashivalaya.

One instrument is available for use at the instant each sign of the zodiac reaches the meridian. This

measured along the ecliptic in an easterly direction, between the first point of Aries and the point of intersection of the ecliptic with the great circle passing through the apparent position of the body and the pole of the ecliptic,—or more loosely, it may be said to be the angular distance of the body measured along the ecliptic in an easterly direction from the first point of Aries.

Celestial latitude and longitude are chiefly used for recording the places of the planets and are especially convenient for this purpose, because the planets (with a few exceptions) are never more than 5 or 10 degrees distant from the Ecliptic.

† The Ecliptic is the sun's apparent path in the star sphere inclined at $23^{\circ} 27'$ to the Equator. The Ecliptic cuts the Equator at two points 180° apart; viz., the vernal and autumnal equinoxes. The vernal equinox is also called the first point of Aries. The points at which the sun is furthest north and south of the Equator are called the solstices.

always occurs at the same instant of sidereal time, and in Captain Garrett's Book a table is given showing the sidereal time appropriate to the use of each instrument and the name of the sign then on the meridian.

As the sun is always in the ecliptic, and its latitude is consequently zero, we may find the sun's longitude by observing with the Rashivalayas without necessarily knowing the time.

8. THE KRANTI WRITTA.—This instrument, in a half finished state, is the first one seen on entering the Observatory. The dial is over 10 ft. in diameter. The construction of revolving metal circles to complete this instrument was found to be too heavy and costly. As however the Kranti Writta is an interesting instrument, it was decided to construct a new one on a smaller scale, utilising for this purpose an old divided brass circle 3 ft. in diameter which happened to be available.

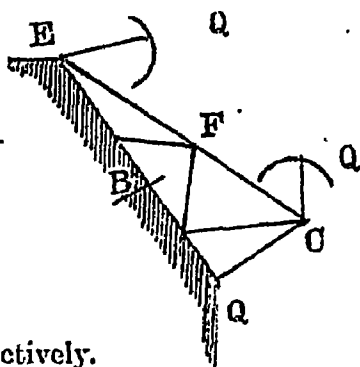
This instrument is used for the direct measurement of celestial latitude and longitude, and is the most efficient instrument for this purpose in the Observatory, as observations can be made at any time.

On the north face of a small masonry pillar, an accurately dressed circular stone is fixed, so that the dressed surface lies in the plane of the equator or at an angle of $63^{\circ} 4'$ to the horizon.

In the centre is a brass pin round which a metal frame rotates, the amount of rotation being noted by a pointer moving over the graduated circumference of the stone.

The framework consists of two brass circles EQ , EC , rigidly bolted together at an angle of $23^{\circ} 27'$, the obliquity of the ecliptic.

As the circle EQ rests always on the surface of the stone, the circle EC must evidently represent the ecliptic, and the points E and C will be the winter and summer solstices respectively.



The ecliptic circle is graduated, and a bar, fitted with a quadrant at each end at right angles to the plane of the circle, is pivoted on its centre, and moves over the ecliptic circle.

Every aspect of the ecliptic can be represented by rotating the metal framework about the pin B , and so adjusting it as to represent the ecliptic at the time of observation. When this has been done one of the quadrant sighting bars is aligned on the object to be observed, then the reading (on the ecliptic circle) of the bar which carries the quadrants gives the celestial longitude, and the reading of the sighting bar on the quadrants gives the latitude.

9 and 10. THE JAI PRAKASH.—This instrument and the Kapali are very similar. They consist of hemispherical cavities representing half of the celestial sphere. One is the complement of the other. The upper rim of the hemisphere is the horizon and is graduated. The diameter is 17 ft. 10 inches—of the Kapali 11½ ft.

The Jai Prakash is the invention of Maharaja.

Sawai Jai Singh, and was devised by him as an improvement on the armillary sphere^{*} and to obviate the difficulties which he seems to have experienced with all large brass instruments. Being an exact model of the star sphere, we can apply a scale of degrees to any part of it, and measure the position of any point, and thus it were apply a measuring tape direct to the heavens themselves.

It is an ideal instrument for demonstrating the so-called doctrine of the sphere, and showing to the eye the apparent motions of the sun, and would be of great educational value to all beginning the study of astronomy.

Two threads or wires are fastened as north-south and east-west across the upper rim.

If a point is taken on the north and south line at the distance of the local latitude below the point where this line cuts the horizon, it marks the *south pole*. Similarly a point on the same line distant local latitude above the point where the meridian cuts the horizon on the north side marks the *north pole*.

If the poles are taken as centres and two circles are drawn with a radius of the maximum declination of the sun, one round each pole, these are the

* The armillary sphere is said to have been invented by Eratosthenes about 255 B.C. It is an astronomical machine composed of a number of hoops or circles, representing the different circles of the celestial sphere as the equator, the ecliptic, &c., put together in their natural order and relative positions. The sphere revolves upon its axis within an horizon divided into degrees and moveable every way upon a brass supporter.

Arctic and *Antarctic* circles, or the circle described by the revolution of the poles of the ecliptic around the poles.

With either pole as centre, if a circle is drawn with a full radius, *i.e.*, radius of the hemisphere—this circle is the *equator*.

Twelve circles can also be drawn (by following the instructions laid down in Captain Garrett's book) which represent twelve positions of the ecliptic, one for each rising sign.

The Hindus attach great importance to the rising of the signs, which form a distinctive feature of their astronomy.

The shadow of the intersection of the wires must be observed in the day; on whichever ecliptic it falls, the corresponding sign is on the horizon.

At the point where the shadow falls on the altitude circles we can find the sun's altitude and where it falls on the azimuth circles, the sun's azimuth.

There are five passages for ingress into and egress from the instrument and steps for descent.

11. THE UNNATANSHA YANTRA—is a huge graduated circle $17\frac{1}{2}$ ft. in diameter hung vertically from masonry supports. There is a brass pointer fitted with sights, pivoted to the centre of the circle. The whole brass circle can be revolved about its vertical diameter so that altitude observations of any object can be taken at any time.

12. CHAKRA YANTRA.—There are two of these instruments. They are exactly analogous to our

modern equatorials and are used for the same purpose, *viz.*, the determination of right ascensions,* declinations and hour angles.

A graduated brass circle 6 ft. in diameter is supported in such a manner that it can be revolved about a diameter parallel to the earth's axis, and therefore pointing to the pole. The amount of the revolution about this axis is measured by a pointer moving over the circumference of a second graduated circle at right angles to the axis of the first. To the centre of the first circle is pivoted a bar (fitted with sights) the extremities of which move over the graduations. If the sighted bar be aligned on any object, the reading on the first graduated circle gives the declination, and the reading on the second circle, the hour angle.

13. THE YANTRA RAJ.—This is a remarkable instrument and appears to have been held in great esteem by Jai Singh, as he wrote a book concerning its construction and use.

It appears to be an ancient type of instrument of Hindu origin, and there is a Sanscrit work dating as far back as the time of Muhammad Tughlak (1325-51) which describes it.

It is really a map or representation of the visible portions of the celestial sphere, provided with a movable ecliptic pivoted to the point representing the pole.

* Right Ascension is the angular distance of a body measured along the Equator in an easterly direction from a fixed point on the Equator called the vernal equinox (or first point of Aries).

Thus every aspect of the ecliptic with reference to the heavens is easily represented, and a large number of problems involving the relations between altitude, azimuth, latitude, longitude, time and position of the heavenly bodies generally, can be solved mechanically.

In the Jaipur Museum there are some more astronomical small brass instruments. Any one who wishes to go further into the subject is referred to Captain Garrett's interesting book, "The Jaipur Observatory and its Builder," 1902, where he will find allusions to some of Jai Singh's Astronomical Theories in which he shows for example that the heavens must be spherical, and that the earth is also a sphere; and he shows how enormous the dimensions of the celestial sphere must be.

He gives the correct explanation of the flattened appearance of the sun and moon when rising and setting, and that this effect is not apparent when the sun and moon are high above the horizon because "the layers of the atmosphere at the zenith, which we look through perpendicularly are few, whereas at the horizon we look obliquely through many more layers and the image is flattened," showing that he was acquainted with refraction.

All prove that Jai Singh was a genuine worker in his favourite science. It is a matter of satisfaction to see that his Observatory has been restored by his descendants.

